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Health-Seeking Behavior Among Older Adults with Hearing Impairment

Mary Dioise Ramos

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This dissertation, HEALTH-SEEKING BEHAVIOR AMONG OLDER ADULTS WITH HEARING IMPAIRMENT, by Mary Dioise Ramos, was prepared under the direction of the candidate's dissertation committee. It is accepted by the committee members in partial fulfillment of the requirements for the degree of Doctor of Philosophy in Nursing in the School of Nursing in the Byrdine F. Lewis College of Nursing and Health Professions, Georgia State University.

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ABSTRACT

HEALTH-SEEKING BEHAVIOR AMONG OLDER ADULTS WITH HEARING IMPAIRMENT

by

MARY DIOISE M. RAMOS

Hearing impairment is one of the most common issues that older adults' experience. About 2% of adults aged 45 to 54 have disabling hearing impairment, and the rate increases to 8.5% for 55 to 64 years old. The incidence of hearing impairment tripled for those 65 to 74 years of age and is approximately 50% for those 75 and older (NIDCD). Despite the fact that hearing impairment affects the lives of older adults, there is often a lengthy delay between the time individuals' first notice that they are having hearing difficulties and when they seek help from a hearing professional. The purpose of the study was to examine the factors that are thought to influence the health-seeking intentions and health-seeking behavior of older adults with hearing impairment.

A prospective correlational design was used. Older adults were recruited in churches and senior centers located in Cobb County, Georgia and screened for hearing impairment by Shoebox Audiometry or the Hearing Handicap Inventory for the Elderly-Screening version with initial data collection and then followed up via telephone after eight weeks. There were 114 participants who enrolled and 103 completed the study. Instruments measured the knowledge and attitudes, stigma, self-efficacy, intention to seek professional help, and health-seeking behavior about hearing impairment.

Knowledge about hearing loss ($p = .003$), social engagement in activities, and health-seeking intention ($p < .001$) were the predictors of seeking professional help

among this sample of older adults with hearing impairment. Social engagement was associated with negative coping strategies, denial of hearing loss, hearing loss stigma, and self-efficacy in seeking help about hearing impairment. Stigma about hearing loss was negatively correlated with self-efficacy in seeking help about hearing impairment. Social engagement in activities was associated with health-seeking behavior of older adults with hearing impairment ($X^{(1)} = 25.44$, $p = <.05$)

The older adults' reasons for not seeking professional help about hearing impairment were mostly related to negative attitudes towards hearing help-seeking. Understanding the various factors related to why such a large proportion of hearing impaired older adults do not seek professional help or consultation is needed so that appropriate screening and assessment programs can be culturally tailored or modified accordingly to the needs of this vulnerable population.

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HEALTH-SEEKING BEHAVIOR AMONG OLDER ADULTS WITH
HEARING IMPAIRMENT

MARY DIOISE M. RAMOS

A DISSERTATION

Presented in Partial Fulfillment of Requirements for the Degree of Doctor of Philosophy
in Nursing in the Byrdine F. Lewis College of Nursing and Health Professions
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2018

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LIST OF ABBREVIATIONS

AAA	American Academy of Audiology
ANSI	American National Standards Institute
ALHQ	Attitude towards Loss of Hearing Questionnaire
ASHA	American Speech-Language-Hearing Association
BMHS	Blue Mountains Hearing Study
CHC	Center for Hearing and Communication
ELSA	English Longitudinal Study of Aging
FDA	Food and Drug Administration
HARQ	Hearing Attitudes Rehabilitation Questionnaire
HHIE-S	Hearing Handicap Inventory-Screening version
HHQ	Hearing Handicap Questionnaire
HI	Hearing Impairment
HL	Hearing Loss
HLS	Hearing Loss Stigma
HSB	Health-Seeking Behavior
IRB	Institutional Review Board
KAB	Knowledge, Attitudes and Behavior Questionnaire
NCA	National Council on Aging
NFO	National Family Opinion
NHANES	National Health and Nutrition Examination Survey
NHIS	National Health Interview Survey

NIDCD	National Institute on Deafness and Other Communication Disorders
OSHA	Occupational Safety and Health Administration
PBC	Perceived Behavioral Control
PCS	Perceived Competence Scale
PTA	Pressure To be Assessed
SQRO	Swedish Quality Register of Otorhinolaryngology
T1	Initial Data Collection (Time 1)
T2	Follow-up Data Collection (Time 2)
TPB	Theory of Planned Behavior
TRA	Theory of Reasoned Action
WHO	World Health Organization

CHAPTER I

INTRODUCTION

Hearing impairment is one of the most common issues that older adults experience. There are an estimated 360 million people who have moderate to profound hearing impairment in the entire world (World Health Organization, 2017). According to the National Institute on Deafness and Other Communication Disorders (NIDCD, 2016) Epidemiology and Statistics Program using the data from 1999-2010 National Health and Nutrition Examination Survey (NHANES), about 2% of adults aged 45 to 54 have disabling hearing impairment, and the rate increases to 8.5% for 55 to 64 years old. The incidence of hearing impairment tripled for those 65 to 74 years of age and continued to rise at approximately 50% for those 75 and older.

Hearing impairment has been shown to influence individuals' health and well-being in various domains and multiple ways. The implications of hearing impairment differ from person to person. However, hearing impairment may lead to social, psychological, and physical effects (Baek et al., 2016; Chen & Lin, 2015; Kamil et al., 2014). When the effects of hearing impairment on personal and social functioning begin to impact individuals negatively, then it may become even more challenging to cope with advancing age. Hearing impairment has been linked to feelings of loneliness, depression, anxiety, social isolation, and has many negative implications including a decrease in a person's quality of life (Carlsson et al., 2011; Carlsson et al., 2015; Chia et al., 2007). In addition, problems linked to hearing impairment include lower cognitive functioning,

poorer functional status, higher rates of fall, and higher mortality (Boi et al., 2012; Kiely et al., 2012).

The World Health Organization (WHO, 2012) projected that hearing impairment will become one of the top ten contributing factors to the burden of disease by 2030. This presents a growing problem because hearing impairment not only negatively affects the older adults' personal lives and the lives of their family members (Davis et al., 2016; Green et al., 2005) it increases the chance of becoming a potential burden to the society and the government.

Despite the efforts to improve delivery of care for people with hearing impairment, and negative health outcomes experienced by hearing impaired individuals, the Center for Hearing and Communication (CHC, 2017) estimated that 15 million people in the United States with hearing impairment avoid seeking help or engaging in hearing intervention. Many older adults do not engage in seeking help or delay seeking assistance for over five years (NIDCD, 2016). Despite the fact that hearing impairment affects the lives of older adults, there is often a lengthy delay between the time individuals first notice that they are having hearing difficulties and when they seek help from a hearing professional.

Significance

Hearing impairment greatly impacts the ability to communicate efficiently and effectively. Nurses take on the responsibility to provide hearing assessment to patients in different health care settings due to lack of available audiological support in many facilities (Kemker et al., 2011; Spencer & Pennington, 2015). Informing health care providers, especially nurses about ways in which behaviors of older adults can be

changed and considering the low rates of help seeking among older adults with hearing impairment (NIDCD, 2016), it is important to learn what can be done. Awareness of an individual's hearing status and determining factors affecting patients' decisions in seeking help are essential to providing successful nursing care. Nurses must advocate for patients' well-being including hearing health and engaging in hearing intervention. Attending to the needs of hearing impaired individuals is an important role of the nurse to improve health outcomes and quality of life in those hearing impaired.

Some investigators reported that it takes about 10 years for hearing impaired individuals to seek professional help from the time they are aware of the hearing problem (Cobelli et al., 2014; Fischer et al., 2011; Saunders et al., 2013; Yueh et al., 2010). Thirty-nine percent of adults over the age of 50 with hearing impairment do not consult a professional about their hearing problems (Schneider et al., 2010). In a study conducted among 193 older individuals, only 36% had sought help from a professional for hearing impairment after they failed a performance-based telephone screening (Meyer et al., 2011). Similarly, in a study conducted among elderly veterans, only 26.6% of the 252 screened individuals who failed the test for hearing impairment had attended an audiology appointment or follow up for hearing intervention (Yueh et al., 2010). Both studies suggested that confirmation of hearing impairment through screening did not motivate many older individuals to obtain help. Some attributed the delay in seeking help to the financial burden of hearing health care (Kochkin, 2007; Wallhagen, 2014). However, many studies reported long delays in seeking help even though they included a free hearing health care program (Cobelli et al., 2014; Saunders et al., 2013; Saunders et al., 2016; Yueh et al., 2010). Therefore, there likely are various factors that influence the

health-seeking behavior of older adults with hearing impairment beyond financial reasons.

Purpose of the Study

The purpose of this study was to examine the factors that are thought to influence the health-seeking intentions and seeking professional help of older adults with possible hearing impairment. Understanding the various factors related to why such a large proportion of hearing impaired older adults do not seek professional help or consultation is needed so that appropriate screening and assessment programs can be culturally tailored or modified accordingly to the needs of this vulnerable population.

The following hypotheses and research questions were proposed:

Hypothesis 1a: More positive attitudes and knowledge about hearing impairment will be associated with more health-seeking intention and seeking professional help among older adults with possible hearing impairment.

Hypothesis 1b: Less stigma about hearing impairment will be associated with more health-seeking intention and seeking professional help among older adults with possible hearing impairment.

Hypothesis 1c: Higher self-efficacy in seeking help about hearing impairment will be associated with more health-seeking intention and seeking professional help among older adults with possible hearing impairment.

Research Question 1d: What factors (knowledge and attitudes about hearing impairment, stigma about hearing impairment, and self-efficacy in seeking help about hearing impairment) are associated with health-seeking intention and seeking professional help among older adults with possible hearing impairment?

Research Question 1e: What is the association between social engagement and self-efficacy in seeking help among older adults with possible hearing impairment?

Theory of Planned Behavior

The Theory of Planned Behavior (TPB) is a theory which links beliefs about a phenomenon and behavior. The concept was proposed by Ajzen (1985) to improve the predictive power of the Theory of Reasoned Action, also known as TRA (Ajzen & Fishbein, 1975). The TRA was derived from previous research that started out as the theory of attitude, such as learning theories, expectancy-value theories, consistency theories and attribution theory, which led to the study of attitude and behavior (Ajzen & Fishbein, 1975). According to the TRA, intention to perform a certain behavior precedes the actual behavior. Due to the criticisms of TRA, Ajzen (1985) extended the TRA to goal-directed behaviors over which an individual has only limited volitional control. The modified theory is called the “Theory of Planned Behavior.” The TPB differs from the TRA, in that it takes into account perceived as well as actual control over the behavior under consideration (Ajzen, 1985). The TPB assumes that rational considerations govern the choices and behaviors of individuals (Ajzen, 1985; Ajzen, 1991; Ajzen & Fishbein, 2005). Specifically, according to a precursor of this theory (TRA), behavior is determined by the intentions of individuals—their explicit plans or motivations to commit a specific act (Ajzen & Fishbein, 1975).

The TPB proposes that a person will likely engage in an actual behavior if the person has an intention to engage in a specific behavior. The intention is strengthened if a person perceives that the behavior is positively viewed (attitude and knowledge), if others

will support the behavior (subjective norms); and how the person perceives the ease or difficulty of executing the behavior (perceived behavior control) (Ajzen, 1985).

Theory of Planned Behavior in Seeking Help for Hearing Impairment

The Theory of Planned Behavior (TPB) guided the study in determining the factors that may contribute to the health-seeking intention and behavior of older adults with possible hearing impairment. The TPB explains the relationships among personal attitudes, subjective norms, perceived behavioral control, behavioral intentions, and actual behaviors (Ajzen, 1985).

The TPB has been used to predict and understand a range of behaviors and help-seeking intentions among the elderly population. To date, few studies have attempted to explain health-seeking for hearing impairment using TPB. In an early work of Wiesner and Tesch-Römer (1996) to examine the relationship between intention and behavior for use of hearing aids in Germany, in a sample of 54 men and women ages 54-87 years old with presbycusis, the actual use of hearing aids was influenced by the older adults' intention to use hearing aids and by normative beliefs of the person. A more recent study by Meister and colleagues (2014) employed a survey design based on the TPB for 204 individuals ages 35 to 87 years old to determine their intention to use hearing aids. The results indicated that the TPB model accounted for a significant proportion of the participants' intention to use hearing aids and that the relative contribution of the three different TPB constructs depended on the participant's stage of seeking help. The intention of the participants who recognized their hearing problems and had consulted healthcare professionals was primarily influenced by the subjective norms; while the participants who already consulted healthcare professionals and used hearing aids were

influenced by all TPB constructs. The intention of the participants who already owned hearing aids was less influenced by subjective norms but more influenced by their attitude toward hearing aids (Meister et al., 2014).

The TPB model's outcome depended on different subgroups that were established according to the stage of their seeking help for their hearing problem. Both studies (Meister et al., 2014; Wiesner & Tesch-Römer, 1996) focused on using hearing aids for hearing impairment and not the factors affecting health-seeking behavior of older adults with hearing impairment. Both studies were conducted outside the United States. The TPB is a useful theoretical framework to investigate the different factors associated with health-seeking intention and health-seeking behavior of older adults with hearing impairment to consult audiologists or other health care professionals about their hearing problem. Understanding the factors associated with seeking help in hearing impairment among older adults may provide opportunities to target interventions to facilitate help-seeking for hearing impairment. The TPB guided the present study to determine the intention and behavior of older adults to seek professional consultation about their hearing impairment while considering various factors in seeking help.

Attitude toward a behavior in the TPB is defined as the degree to which performance of the behavior is positively or negatively viewed (Ajzen, 1991). The TPB construct 'attitude toward the behavior' was operationalized as knowledge and attitudes about hearing impairment by older adults. Knowledge and attitudes about hearing impairment were defined as perceived beliefs and understanding about hearing loss by older adults. There is evidence to suggest that older adults are more likely to seek help if they are aware of severe hearing sensitivity or asymmetry about their hearing (Saunders,

Chisolm, & Wallhagen, 2012). Measuring the knowledge and attitudes of older adults about their hearing impairment allowed for determining whether attitude about or knowledge of hearing impairment are associated with older adults' intention and seeking help from an audiologist or health care professionals.

Subjective norm is an individual's perception about the particular behavior, which is influenced by the judgment of significant others (Ajzen, 2001). The subjective norm construct of TPB was operationalized as a perceived stigma about hearing impairment. The stigma about hearing impairment is the extent to which older adults are concerned about what others might think should they find out that the older adults were seeking professional help about their hearing problem or having a hearing impairment. Older adults often sought more help if they believed that their significant others were supportive of their seeking intervention for hearing impairment (Meyer & Hickson, 2012). Additional evidence suggested that older adults were more likely to seek help if they experienced more social pressure than those individuals who did not experience that social pressure (Meister et al., 2014). Therefore, the perception of what others in the older adults' social network might think influences the seeking intention and actual behavior of older adults for audiological or professional consultation.

Perceived behavioral control is described as an individual's perceived ease or difficulty of performing the particular behavior (Ajzen, 1991). It is assumed that perceived behavioral control is determined by the total set of accessible control beliefs. The perceived behavioral control construct of the TPB model was conceptualized as self-efficacy in seeking help about hearing impairment. Self-efficacy in seeking professional help refers to the extent to which older adults are confident in their ability to seek

professional help for assessment of their hearing impairment. Efficacy beliefs can influence an individual to decide specific actions or choose alternatives regarding the issues or challenges that they experienced, which have implications for help-seeking for hearing impairment (Bandura, 1997). In a study of 153 older adults with hearing impairment, researchers found that self-efficacy in hearing intervention influenced the decision to consult healthcare professionals (Hickson et al., 2014). Meyer et al. (2014) had similar findings of the impact of self-efficacy in hearing intervention on the decision of 307 older adults to seek professional help and hearing aid adoption. However, more studies are needed to explore different factors that are related to self-efficacy in seeking help among older adults with hearing impairment. Researchers have become increasingly aware of the influence of self-efficacy on health behavior and healthcare outcomes (Hickson et al, 2014; Meyer et al., 2014; Saunders et al., 2016; Smith et al., 2011).

The stronger the intention to perform a behavior, the more likely the behavior will be performed (Ajzen, 1991). The behavioral intention was operationalized as intention to seek professional help about hearing impairment. Behavior is a function of compatible intentions and perceptions of behavioral control. Perceived behavioral control is expected to moderate the effect of behavioral intention, such that when perceived behavioral control is strong, then a favorable intention produces the behavior (Ajzen, 1991). Figure 1 shows the application of TPB to the health-seeking intention and behavior among older adults with hearing impairment.

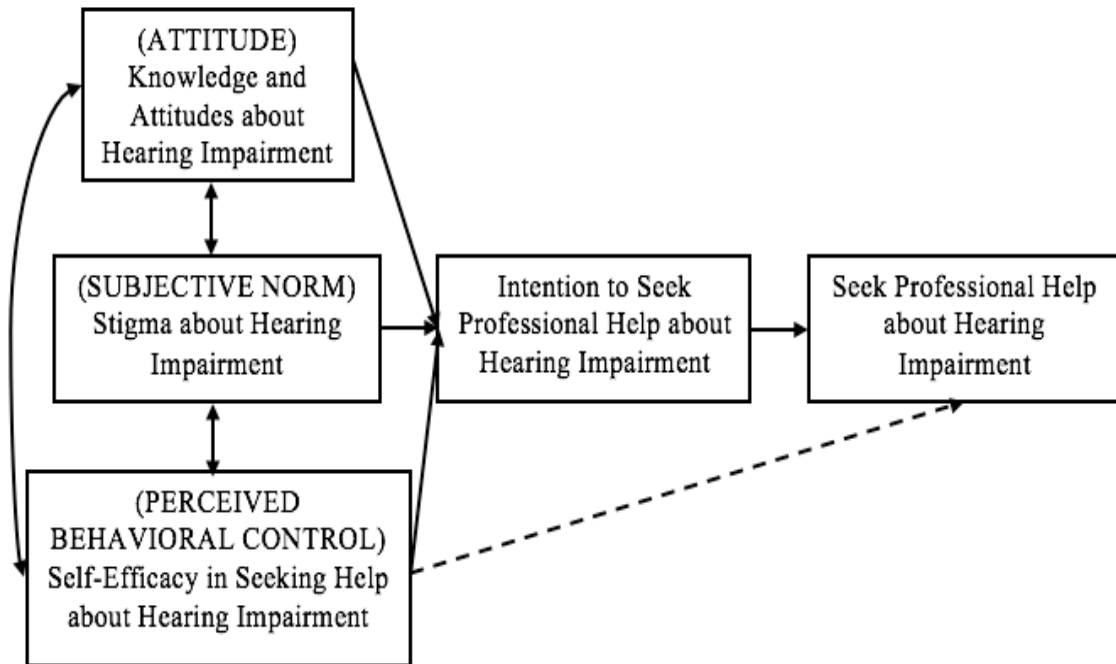


Figure 1. Theory of Planned Behavior Adapted for Health-Seeking Behavior of Older Adults with Hearing Impairment: Ajzen, 1985

Assumptions

The TPB provides insight into how individuals' intention to perform a particular behavior depends on their beliefs about the behavior, the social norms and perceived control over the behavior. Intention is the cognitive representation of a person's readiness to perform a given behavior, and it is considered to be the immediate antecedent of behavior.

The following assumptions are inherent in TPB:

- All behaviors are motivated.
- Attitudes can change overtime.
- Human beings are rational.
- People are honest.
- People care about their hearing health.

- Health is important for human beings.
- Human beings make systematic use of resources available to them.
- Human beings consider the implications of their actions before they decide to engage or not engage in certain behaviors.

Summary

Hearing loss is a common occurrence among aging population. Hearing loss is a growing problem that not only negatively affects the older adults' personal lives; it also increases the chance of becoming a potential burden to the society. Despite the negative impact of the hearing problem, older adults delay seeking help or do not seek help about the hearing problem. The main purpose of the study was to determine the factors that are associated with health-seeking intentions and seeking professional help by older adults with possible hearing impairment. This study determined the association of social engagement to the self-efficacy in seeking help among older adults with possible hearing impairment. A better understanding of the various factors related to why such a large proportion of older adults with possible hearing impairment do not seek professional help is needed to create an appropriate culturally tailored intervention.

CHAPTER II

LITERATURE REVIEW

This chapter provides a summary of the impact of hearing impairment on older adults, an overview of the health-seeking behavior of older adults with hearing impairment, and factors that are thought to influence the health-seeking behavior of older adults with hearing impairment.

Hearing Impairment in Older Adults

Older adults, people who are 65 years of age or older, are the largest consumers of health care. Aging of the baby boomer generation and increased longevity will result in a doubling of the population older than 65 by the year 2030 (Ortman, Velkoff, & Hogan, 2014). Hearing impairment is one of the most common conditions affecting older adults. Hearing loss is quantified by determining intensity levels or thresholds at which tones ranging from 250 Hz to 8000 Hz are lost. The thresholds are measured in decibels hearing level (dB HL). The normal hearing level is ≤ 25 dB HL. Hearing impairment on the basis of the better ear, four-frequency pure-tone average as follows: slight impairment (26-40 dB HL); moderate impairment (41-60 dB HL); severe impairment (61-80 dB HL), and profound impairment (≥ 81 dB HL). A significant (disabling) hearing loss has been defined as a hearing loss greater than 40 decibels in the better hearing ear (WHO, 2016). One in three people older than 65, and half of those older than 85 have some degree of hearing loss (National Health Interview Survey, 2014). Prevalence is greatest in South Asia, Asia Pacific, and sub-Saharan Africa (WHO, 2016).

Presbycusis is the loss of hearing that gradually occurs in most individuals as they grow older. Presbycusis is the most common cause of hearing impairment, which is typically gradual, progressive, and bilateral (Chou, Dana, & Bougatsos, 2011). This means that hearing impairment will get worse over time, and if a person loses the ability to hear, it will be permanent. Hearing impairment in older adults is multifactorial. Aside from degeneration due to aging, presbycusis occurs as a result of exposure to noise, heredity, certain medications, history of ear infections, and the presence of systemic diseases (Agrawal, Platz, & Niparko, 2009; Hull, 2011; Roland & Kutz, 2015). Hearing impairment initially affects higher frequencies and interferes with sounds such as /s/, /sh/, /f/, and /th/ (Hull, 2011; Chou, Dana, & Bougatsos, 2011). Problems in hearing can make it hard for older adults to communicate, such as talking with friends and family, understanding and following doctors' advice, and responding to warnings or alarms (Newton & Shah, 2013; Kamil & Lin, 2015; Hoffman & Cosetti, 2016). All of these can be frustrating, embarrassing, and even dangerous.

Screening can identify individuals with possible hearing impairment who might benefit from further evaluation and assessment to determine if a hearing intervention or other therapies to address hearing problems are needed. However, there is evidence that even now, less than half of the people older than 65 who could benefit from hearing aids purchase them (American Speech-Language-Hearing Association, ASHA, 2016). Older individuals may not realize that they have hearing impairment because symptoms are relatively mild or slowly progressive, or because of the belief that the degree of hearing loss that they experience is just a normal part of aging. There is no known cure at this time once hearing loss occurs.

Impact of Hearing Impairment in Older Adults

The impact of hearing impairment in older adults is not simply determined by sensory loss or in physiological capacity. According to the American Speech-Language-Hearing Association (ASHA, 2016) hearing impairment is a unique personal experience, and how the person copes will depend on different factors that affect day-to-day situations. Regardless of the contributory factors or the cause of hearing impairment, the interference with communication has profound negative effects on the lives of older adults. In addition to the threat to personal safety and well-being, hearing impairment has an adverse impact on physical, cognitive, emotional, social, and behavioral function (Ciorba et al., 2012; The National Council on the Aging, 1999).

Several studies have documented the impact of untreated hearing impairment (Baek et al., 2016; Kamil et al., 2014; Sogebi et al., 2015). Hearing impairment may exert a direct impact on mental health (Dewane, 2010). Depression and adjustment disorder may occur as a natural response to hearing impairment and its subsequent impact on the quality of life (Industrial Safety & Hygiene News, 2015). Alternatively, some individuals have an existing pre-morbid mental health issue and hearing impairment makes the problem more complex (ASHA, 2016). Carlsson et al. (2015) conducted a retrospective study of 2,319 patients with severe to profound hearing impairment using the Swedish Quality Register of Otorhinolaryngology (SQRO) to investigate their quality of life and psychosocial consequences regarding sick leave and hearing intervention. The SQRO contained questions about family history of hearing loss, marital status, education, working life, sick leave, and chronic diseases. The findings revealed that patients with severe or profound hearing impairment perceived higher levels of anxiety and depression

compared to the general population. The results of the study are consistent with the analysis conducted using the Longitudinal Aging Study Amsterdam among 1,826 participants to find the association between hearing loss, depression, and loneliness. The researchers found that worse hearing status, living with a partner, and higher socioeconomic status were associated with higher social and emotional loneliness (Pronk et al., 2013). The relationships between hearing impairment, depression, and loneliness are established. However, the specific component of the socioeconomic status was not explored in relation to the social and emotional loneliness level of older adults with hearing impairment. It was also counterintuitive that living with a partner and having higher socioeconomic status resulted in higher social and emotional loneliness scores.

Communication is an important aspect of everyday life, which can be gravely impaired in older adults with hearing impairment, leading to a perceived reduction of quality of life (Ciorba et al., 2012). The Blue Mountains Hearing Study (BMHS, 2007) was conducted to investigate the effects of unilateral and bilateral hearing impairment and the associated benefits of using a hearing aid or undergoing hearing intervention among 2,431 community-living older adults in Australia. Chia and his colleagues (2007) assessed the participants self-perceived hearing problems using the Short Form Health Survey (SF-36) as a measure of health-related quality of life and found out that bilateral hearing impairment and severe levels of impairment were associated with poorer health-related quality of life scores in both physical and mental domains. Participants with self-reported hearing impairment had poorer health-related quality of life than participants without hearing impairment. The findings are similar to the study conducted among a convenience sample of 64 elderly Chinese participants to assess the impact of hearing

impairment on health-related quality of life. Wong and Cheng (2012) found out that Chinese elderly with hearing impairment have poorer physical functioning, role limitation due to physical problems, less vitality, lower social functioning, poorer mental health, and role limitations due to emotional problems compared to the general population. In contrast to the BMHS study, the degree of hearing impairment was not related to poorer physical and mental outcomes.

The commissioned survey by the National Council on Aging (1999) is often cited in various research literature since it included 4,000 adult participants with hearing impairment and their significant others. Kochkin and Rogin (2000) revealed significantly higher rates of depression, anxiety, and other psychosocial disorders in individuals with hearing impairment who did not undergo hearing intervention. The findings were consistent with the older large randomized controlled study among 194 hearing-impaired elderly veterans, which found that hearing impairment was associated with decreased social, communication, and cognitive function, and higher incidence of depression for subjects who did not use hearing aids (Mulrow et al., 1990). The evidence indicates that if hearing impairment remains untreated, it can lead to negative psychosocial outcomes.

The literature provides strong evidence indicating that hearing impairment represents a great deal of burden and negatively impacts psychological, social, and quality of life of older adults. The research literature also suggests that older adults with unaddressed hearing impairment have worse health outcomes than people who have undergone hearing intervention. However, since most of the studies have investigated the etiology of age-related hearing loss, some disease-specific associated factors may have been overlooked. A causal relationship cannot be drawn between hearing impairment and

poor health-related quality of life due to the nature of the cross-sectional study designs that have been frequently used. Therefore, it may require different methods of study to explain and determine the consequences of hearing impairment. Since most of the studies indicated that hearing impairment can result in negative health outcomes, more studies are needed to identify or determine the needs of older adults in relation to their hearing loss or hearing impairment that could lead to serious complications.

Health-Seeking Behavior

The broad nature of the process of health-seeking makes it challenging to develop a universal operational definition because of how diversely it has been investigated to date. Health-seeking behavior has been defined as:

- a) Actions undertaken to care for, maintain, and uphold one's health, regardless of current health status (Bausell & Bausell, 1987);
- b) A multi-dimensional concept which relies on time and context (Poortaghi et al., 2015);
- c) Decision making for healthcare at the household level where the decisions made encompass all available options whether it will be public, private, modern, or traditional (Tipping, 2000);
- d) A behavior of a person actively searching about different ways to be able to achieve higher-level wellness (Hampshire et al., 2011). Health-seeking is used interchangeably in other studies as help-seeking.

Help-seeking is defined as an adaptive coping process that is the attempt to obtain external assistance to deal with a health concern (Rickwood & Thomas, 2012). Kiessling et al. (2003) defined hearing help-seeking as pathway, a process, a timeline, or a series of steps. Laplante-Levasque and colleagues (2012) identified four main categories of help-

seeking in their qualitative study, which included: 1) perceiving hearing impairment, 2) seeking help for hearing, 3) using hearing aids, and 4) perspectives and knowledge about approach to hearing impairment, help-seeking, and hearing aid use. Participants in the qualitative study described hearing help-seeking and hearing intervention in the context of their daily lives, and rarely described to be connected during clinical encounter with healthcare professionals towards hearing help-seeking and hearing intervention.

Understanding help-seeking in the context of decision-making of older adults with hearing impairment is important to identify the various interrelated factors that affect health-seeking. Health-seeking behavior was defined in this study as an action performed by older adults with possible hearing impairment to obtain or get treatment or intervention about their possible hearing impairment from a healthcare professional.

Factors that Affect the Health-Seeking Behaviors of Older Adults with Hearing Impairment

Knowledge and Attitude of Older Adults about Hearing Impairment.

Older adults often relate health problems to old age rather than disease processes and identify health issues and physical decline as a normal part of aging (Meyer et al., 2014). Presbycusis is the term used to describe hearing loss associated with aging that decreases hearing sensitivity and affects the ability to communicate. Age-related hearing loss most often affects both ears. Since age-related hearing loss often occurs gradually, older adults may not realize that they are experiencing a loss of their ability to hear (NIDCD, 2015). The perception that hearing loss is a normal part of aging and thus requires no attention and assistance seems to be typical of older individuals (Elias & Lowton, 2014). This misconception about the decline in hearing being due to aging, can

cause a delay in seeking help or treatment that may bring about psychosocial implications that will affect the quality of life of older adults.

In a qualitative study conducted by Carson (2005) among seven participants that were all seeking help for hearing loss, one theme “contrasting/comparing” emerged: women contrasted or compared their hearing along dimensions related to self or about others or the environment. The comparing theme was the process relating the slow decrease in hearing ability to that of losing one’s sight or contracting a potentially life-threatening illness. When comparing hearing loss to a life-threatening illness, the degree of the loss is judged as a more serious situation that gradually affects day to day functioning. These women contrasted their present hearing level to how they used to hear at different points in time. The contrasting/comparing approach was a way of placing hearing difficulties into context when it comes to help-seeking. In the early stages of hearing impairment, this process is likely to delay health-seeking for hearing impairment. As hearing ability declines, this process of comparing one’s hearing loss may facilitate the process of health-seeking (Carson, 2005).

There is evidence that understanding the degree of impairment that hearing loss brings to the lives of older adults influenced their decision to seek professional help or consultation. In a study conducted by Laplante-Levesque and colleagues (2011) of 139 older adults, hearing difficulties that were more complicated in nature, such as increased awareness of hearing sensitivity or asymmetry resulted in seeking a professional consultation sooner among older adults. Similarly, using a single measure of self-perceived hearing ability was predictive of hearing consultation among a sample of 802 adults ages 18 to 97 years old (Palmer et al., 2009). The probability of an audiological

consultation decreased as perceived hearing ability increased (Odds ratio = 0.47, $p < 0.01$). Likewise, in an older study conducted among 281 older adults by Duijvestin and colleagues (2003), 84% of the 115 participants who sought help from a professional about their hearing impairment perceived their hearing to be poor, while 57% of the 166 participants who did not seek professional help perceived that their hearing loss did not affect their daily lives. These studies did not include measures of how hearing loss affected functional ability, only the older adults' perception of how hearing loss affected their lives.

In a recent retrospective study conducted among 307 Australian older adults by Meyer and colleagues (2014), participants were asked for their primary reason for not seeking help. Slightly less than half (40%) of the 55 participants who did not seek help responded that they felt their hearing was not bad enough to consult a professional about it. The researchers also postulated that older adults were more likely to seek professional help if they perceived more potential benefit of hearing intervention and reported more activity limitations as a result of hearing impairment (Meyer et al., 2014).

Limited research has been conducted in determining the association of individual factors such as attitudes or knowledge of older adults about hearing loss and the degree of hearing impairment to their health-seeking behavior. Studies about hearing and interventions for those hearing impaired indicated that audiological factors alone are insufficient to prompt help-seeking for older adults with hearing impairment. Exploring the relationship or association of knowledge and attitudes of older adults with hearing impairment to the health-seeking behavior intention of older adults with hearing impairment is warranted to determine the personal characteristics or factors that can

affect the likelihood of the older adults to engage in health-seeking behavior before their hearing impairment worsens.

Stigma Related to Hearing Impairment

Stigma has been described as a belief that a person has some attribute that carries a social identity that is devalued in a particular social perspective (Crocker, Major, & Steele, 1998). Individuals often have the tendency to negatively typecast older adults with hearing impairment that can lead to a detrimental effect on how others will perceive them. There is significant support to suggest that stigma is one of the salient reasons given that affects the decision of older adults in seeking professional help about hearing impairment (Kochkin, 2007; Meyer et al., 2014; Southall et al., 2010). Older adults with hearing impairment are often seen by others as dull, senile, and unfavorable partners for interaction (Heine & Browning, 2004). Perceived stigma is one of the most commonly reported factors in the literature for seeking professional help about the hearing problem (Meister et al., 2014; Southall et al., 2010; Wallhagen, 2010).

In a qualitative study of 91 older adult dyads, the stigma of seeking professional help for hearing impairment was associated with experiences of altered self-perception, ageism, and vanity that delayed the decision to seek professional help about the hearing impairment (Wallhagen, 2010). Older adults with age-related hearing loss were frequently seen by others to be socially inept with decreased psychological capacity, making them uninteresting, and poor partners in communication (Wallhagen, 2010). The result of the study is similar to the findings of a qualitative study that explored the negative and positive influences of stigma on help-seeking from 10 members of a peer support group who had hearing loss. Southall and colleagues (2010) found that

individuals with hearing impairment experienced a climax of negative stress leading to an unmanageable situation due to stigma. Part of this stress was caused by denial of the hearing loss, in which most participants did not want to be labeled as “hard of hearing” due to the stigma they felt they would experience when seeking for professional help. The participants narrated that it was easier to conceal their hearing loss from friends and family for fear of being labeled as old or stupid. If family and social networks have a negative attitude towards seeking professional help, the older adults with hearing impairment have the potential to delay the health-seeking process (Meister et al., 2014; Southall et al., 2010;).

In a cross-sectional study conducted among Indians aged 41-65 years old, the participants reported that they thought their family members and friends would not accept them if they wore hearing aids. The participants perceived that using a hearing aid was a sign of weakness/handicap (Archana et al., 2016). A short screening survey among 80,000 members of the National Family Opinion (NFO) panel about hearing loss, Kochkin (2007) revealed that participants chose not to seek professional help or consultation due to perceived stigma that hearing impairment was a disability and an embarrassment to the public.

In contrast, if family and social networks possess a positive view towards seeking professional help, they have the potential to facilitate the health-seeking for hearing impairment (Meyer et al., 2014). In a study conducted among 1,419 adults aged 55 years and older, if family or significant others viewed that older adults had hearing difficulty they encouraged the individual to seek professional help (Duijvestijn et al., 2003). Older adults who experienced more social pressure to seek help were more likely to do so than

individuals who did not experience that social pressure (Southall et al., 2010; Wallhagen, 2010;).

The evidence indicates that significant others can either facilitate or delay health-seeking for hearing impairment. These inconsistent findings show how the individual's perceptions of their family members' opinions and how their family members perceive stigma of hearing aids differ. The significant others role in the health-seeking behavior of older adults with a hearing impairment was explored to determine its influence on the decision making of aging individuals that could lead to timely or significant delay in seeking help about hearing impairment to healthcare professionals. Also, how older adults are influenced by their peers and family members was examined to determine the likelihood of the older adults to seek professional help about their hearing impairment.

Self-Efficacy in Seeking Professional Help about Hearing Impairment

Self-efficacy was found to be one of the factors that affected the older adults' decision to seek professional help about hearing problems (Laplante-Levesque et al., 2011; Meister et al., 2014; Meyer, Hickson, & Fletcher, 2014). Perceived behavioral control, which was conceptualized as self-efficacy in this study, is a significant factor in determining hearing aid use and participation in intervention among older adults with hearing impairment. The participants' likelihood to use hearing aid was influenced by the question of whether the factors that might facilitate or impede treatment were under individual control (Meister et al., 2014). Similarly, the impact of self-efficacy on seeking professional help influenced older adults' decision to seek help for hearing assessment and possible intervention if they reported no visual disability, had experienced hearing

loss for a longer period, reported more positive support from significant others, and if they were not anxious about using hearing aids (Meyer, Hickson, & Fletcher, 2014).

Meyer, Hickson, and Fletcher (2014) found out that low levels of self-efficacy in seeking professional help could, in fact, be attributed to a more general fear of utilization of advanced technology for hearing intervention. Older adults with hearing impairment with greater confidence in their ability to communicate were less likely to opt for hearing intervention (Laplante-Levesque et al., 2011). Likewise, older adults with greater communication skills and no issues interacting with others despite the difficulty of hearing did not participate in communication programs or interventions (Cornally et al., 2011). In contrast, older adults with hearing impairment who were curious and imaginative were more likely to seek professional help than their counterparts (Cox et al., 2005). In a study conducted among 204 individuals aged 35 to 87 years old in Germany, Meister and colleagues (2014) found out that perceived barriers were a significant factor associated with the help-seeking behavior of older adults with hearing impairment: people who perceived fewer barriers such as attitude toward the behavior, subjective norm, and perceived behavioral control had a greater intention to seek professional help.

Social Engagement

Staying socially engaged and maintaining interpersonal relationships can help older adults maintain good physical and emotional health (Matz-Costa et al., 2015). Social isolation is a serious problem for older adults who gradually lose the ability to communicate and interact with their family, friends, and colleagues. Results from 811 participants aged 55 years and older in Sydney, Australia of the Blue Mountains Hearing Study revealed that participants with hearing impairment were likely to experience social

engagement restrictions five years later (Gopinath et al., 2012). Older adults with hearing impairment who do not use hearing aids participated significantly less in social activities (Amieva et al., 2015). In addition, a review on behalf of the U.S. Preventive Services Task Force (Moyer, 2012) identified in a randomized controlled trial that older adults who engage in hearing rehabilitation had small improvements in social engagement (Mulrow et al., 1990). However, no improvements in social engagement were noted among older adults with hearing impairment who wear hearing aids (Stark & Hickson, 2004). Also, in a study cohort of 666 community-dwelling older adults with hearing impairment, there was no evidence that hearing rehabilitation promotes social engagement (Dawes et al., 2015).

In a cross-sectional survey conducted among 156 older participants about hearing loss, self-efficacy, and social engagement, results revealed that there was a direct effect of hearing-related activity limitations on participation restrictions and a direct effect of self-efficacy level on perceptions of hearing difficulties (Hefferly, 2009).

Few studies have investigated the relationship between social engagement related to hearing loss and seeking help for hearing impairment. Further exploration may be helpful in understanding the complex responses to the loss of function, health-seeking behaviors, impact on communication, social engagement and quality of life.

Many older adults with hearing impairment have low levels of confidence in their ability to seek professional help and hearing intervention. Despite the growing literature about self-efficacy in health promoting behaviors, research on hearing impairment has not adequately described the relationship of self-efficacy or perceived behavioral control and social engagement in hearing impaired older adults. Further investigation is needed

to address the connection between self-efficacy in health-seeking behaviors of older adults and social engagement in older adults with hearing impairment.

Socio-economic Status

Studies have shown that the socio-economic status of an individual was associated with health-seeking behavior (Miles et al., 2011; Patel et al., 2007). Health-seeking behavior is one of the aspects through which socioeconomic status can influence health outcomes (Stowasser et al., 2011). Accessibility and affordability of health care services, alongside income distribution and educational opportunities, are important areas where health outcomes may be improved through intervention (Mackenbach et al., 2008). Ploubidis and colleagues (2011) found in the analysis of the English Longitudinal Study of Aging (ELSA), a nationally representative multi-purpose sample of the population aged 50 and over living in England, that behaviors and financial resources were significantly associated with health outcomes rather than psychosocial factors. Fischer and colleagues (2011) had similar findings that higher educational level was linked with increased engagement in hearing intervention among older adults. Similarly, Benova and colleagues (2014) found out that higher socioeconomic status was associated with lower odds of self-reported hearing impairment (OR=0.87, $p < .001$).

In United States of America, health care coverage for hearing assessment and intervention varies from state to state. Medicare Part B includes costs associated with hearing assessment if the physician ordered the hearing test to determine whether medical intervention is necessary, or if the test will aid to diagnose or treat a medical condition. However, testing for hearing related to the use of hearing aids is not covered (Centers for Medicare and Medicaid Services, 2017).

In a study conducted by Arnold, Hyer, and Chisolm (2017) about the Medicaid hearing aid coverage for older adults, they identified 28 states that provide Medicaid coverage for hearing aid assessment and associated services for eligible older adult beneficiaries. In the remaining 22 states, older adults with financial constraints have difficulty accessing hearing health care. Georgia is one of the states that ranked poor on Medicaid hearing aid policies for beneficiaries ages 21 and older. Only four states--Arkansas, Connecticut, New Hampshire, and Rhode Island--currently mandate health insurance companies to provide hearing aid coverage for adults (ASHA, 2017). Several states have pending legislation about hearing aid coverage. The United States Department of Veterans Affairs provides assistance for hearing tests, examinations, and hearing aids among eligible veterans. The aging population, increase in life expectancy, and the focus on ill-health among the older age group in wealthy countries have highlighted the importance of examining pathways leading to socioeconomic inequalities in later life health.

There is a need to address the influence of social and economic factors leading to inequalities and disparities in health outcomes. Current research about socioeconomic determinants of health-seeking for hearing loss is limited mainly to the examination of hearing aid ownership. Further study is warranted to examine the association between health-seeking behavior of older adults with hearing impairment and income so that appropriate policies and programs can be created to prevent health disparities.

Gaps in Literature

The literature review shows that health-seeking behavior of older adults with hearing impairment is influenced by various factors, such as knowledge and attitudes about hearing impairment, stigma related to hearing impairment, self-efficacy in seeking professional help about hearing impairment, and socioeconomic status. Other factors or variables that limit the older adults with hearing impairment to seek professional help were explored in this study.

Most of the literature addresses only one factor affecting how older adults are influenced to seek professional help about their hearing impairment. This study examined the relationships among attitudes and knowledge about hearing impairment, stigma, self-efficacy, income and health-seeking intention and behavior of older adults with hearing impairment.

Further study is needed of older adults with hearing impairment from diverse backgrounds to determine the multi-factorial phenomena that may impact the health-seeking behavior of this vulnerable population. To understand the health-seeking behavior of older adults with hearing impairment, all potential influences need to be examined, and all factors should be examined together.

Most of the quantitative studies included questionnaires developed by researchers that have limited reliability measures. Few studies have used more analytical techniques to identify the unique predictors of health-seeking behaviors of older adults with hearing impairment. Identifying the most salient factors will serve as a foundation for future intervention studies.

CHAPTER III

METHODOLOGY

This chapter describes the methods that were used in conducting the study. The following sections are included: research design, sample and setting, instruments, study procedures, data management and analysis plan, and methods used to protect human subjects.

Research Design

A prospective correlational design was used to examine the factors that are associated with health-seeking intentions and seeking professional help about hearing impairment among older adults with hearing problems. Standard questionnaires were administered at two-time points. Time 1 (T1) was the initial collection of data in person using a set of self-report questionnaires. The participants were contacted via telephone or mail at eight weeks, Time 2 (T2) after the initial interview to determine if they sought help for hearing impairment.

Sample and Setting

The target population was community dwelling older adults currently residing in the State of Georgia. Participants were recruited from churches and senior centers in Cobb County, Georgia.

The inclusion criteria for participants were: age 60 years old and older, able to read and write English, and having possible hearing impairment based on either a moderate handicap score (10-24) on the Hearing Handicap Inventory-Screening version

(HHIE-S) questionnaire (Ventry & Weinstein, 1983), or having failed the hearing screening test using the Shoebox Audiometry.

Participants were excluded from the study if they: both passed the hearing screening test using Shoebox Audiometry and have no hearing handicap (0-8) based on HHIE-S, reported that they have owned a hearing aid, resided in a high-care facility or nursing home, and had dementia as determined by the medications they were taking. Details about the screening instruments are found in the instrument section.

Sample Size

A power analysis was conducted using a-priori statistical power calculator for multiple regression to determine the sample size (Soper, 2016). For a medium effect size of 0.15 using Cohen's f^2 , an alpha level of 0.05, a statistical power level of 0.80, and six predictor variables, sample size of 97 was estimated as needed to address the study aims. A total of 114 participants were enrolled and 103 participants completed both data collection time points.

Instruments

Instruments used to collect data are described below. Table 1 provides an overview of the instruments used in the study.

Screening Instruments.

Screening for potential hearing impairment was done with two instruments - a self-report questionnaire and an audiometric program. The self-report questionnaire was the Hearing Handicap Inventory for Elderly-Screening version (Ventry & Weinstein, 1983). The Hearing Handicap Inventory for the Elderly-Screening version (HHIE-S) is a 10-item questionnaire developed to assess how older adults perceive the social and

emotional effects of hearing loss (Ventry & Weinstein, 1983). The response are Yes (4 points), Sometimes (2 points), and No (0 point). The HHIE-S items are summed for total scores ranging from 0 (no handicap) to 40 (maximum handicap), with higher scores indicating a greater handicapping effect of hearing loss. The interpretation of HHIE-S is as follows: a score of 0-8 suggests no hearing handicap, 10-24 suggests mild-moderate hearing handicap, and 26-40 suggests significant hearing handicap (Ventry & Weinstein, 1983; Greenberg, 2013). A moderate handicap score of 10 and above on the HHIE-S was the screening criterion for inclusion.

The HHIE-S has been widely used since the early 1980's (ASHA, 1997; Milstein & Weinstein, 2007; Pacala & Yueh, 2012). The HHIE-S is available in many languages (Helfner-Mitchell, 2001; Lichtenstein & Hazuda, 1998; Oberg, 2016) and may be completed in a few minutes. It is effective at assessing the effect of the hearing loss on a person's everyday function and may identify individuals more likely to accept intervention (Ventry & Weinstein, 1983). The sensitivity and specificity of HHIE-S are approximately 75-80% for identifying hearing losses of moderate or greater degree (Deepthi & Kasthuri, 2012; Tomioka et al., 2013; Ventry & Weinstein, 1983). Internal consistency reliability (Cronbach's alpha) coefficients have been reported between 0.87-0.91 in a sample of older adults with hearing problems (Ventry & Weinstein, 1983; Yueh et al., 2003; Yueh et al., 2010). Test-retest reliability was reported as 0.80-0.85 (Milstein & Weinstein, 2007; Pacala & Yueh, 2012). Since responses are self-reported, the use of the tool is limited to those cognitively intact individuals who can respond verbally or in written form to the questions (Ventry & Weinstein, 1983).

Audiometric screening was done using the Shoebox Audiometry. Shoebox Audiometry is the first clinically validated portable iPad audiometer (Rourke, Kong, & Bromwich, 2016). Shoebox is a class II medical device, listed with the Food and Drug Administration (FDA) and Health Canada. Shoebox conforms to current American National Standards Institute (ANSI) and the Occupational Safety and Health Administration (OSHA) (Clearwater Clinical, 2016). There are two versions of Shoebox; the standard edition was used in the study. The standard edition can be self-administered to test at three or more hearing frequencies. This edition is ideal for use in settings where simple pass or fail is all that is needed to quickly assess if the person requires more detailed follow-up examinations. The Shoebox standard edition has an automated game play that provided automated audiogram output. Having a pure tone average of more than 25 dB HL requires further hearing assessment and testing indicating that they failed the Shoebox audiometry test. Participants were eligible if they failed the Shoebox audiometry screening test.

Table 1
Overview of Study Instruments

Variables	Instruments	Scoring	Interpretation
<u>Outcome Measures:</u>			
Health-Seeking Behavior	Actual Seeking Professional Help	Yes/ No	Yes (If they seek professional help from their primary care physician, an audiologist or EENT).
Intention	Intention to Seek Professional Help	1 item. 5-point Likert scale: 1 (least likely) to 5 (most likely). Score range: 1-5	Higher scores indicating higher intention to seek professional help.
<u>Predictor Variables:</u>			
Knowledge	Knowledge, Attitudes and Behavior Questionnaire (KAB)	16 items from knowledge scale. 5-point scale: 1 (I know this is true) to 5 (I know this is false). Scores are summed, percent score are automatically computed. Total score range: 0-100	Higher scores indicating higher level of knowledge about hearing.
Attitudes	Attitude towards Loss of Hearing Questionnaire (ALHQ)	22 items. 5 subscales: denial of hearing loss (6), negative associations (4), negative coping strategies (8), manual dexterity and vision (3), hearing-related esteem (2). 5-point scale: a (Strongly disagree) to e (Strongly agree). Item 1 used for 2 subscales. Scores are summed and divided by the number of items in the subscales. Total score range: 1-5	Higher scores indicating less favorable attitude towards hearing loss.

(Table 1 Continues)

(Table 1 Continued)

Variables	Instruments	Scoring	Interpretation
Stigma	Hearing Attitudes Rehabilitation Questionnaire (HARQ)	8 items. 2 subscales: hearing loss stigma (HLS) (5), perceived external pressure to be assessed (PTA) (3). 3-point scale: 3(true) to 1(not true). Scores are summed. Score ranges: 5-15, 3-9	Higher scores indicating stronger stigma about hearing loss. HLS: 5-8 (low), 9-11 (average), 12-15 (high) PTA: 3-4 (low), 5-7 (average), 8-9 (high).
Self-Efficacy	Perceived Competence Scale (PCS)	4 items. 7-point scale: 1 (not at all true) to 7 (very true). Scores are summed and divided by 4 items. Total score range: 1-7	Higher scores indicating higher self-efficacy for seeking professional help.
Social Engagement	Hearing Handicap Questionnaire (HHQ)	5 items. Social restriction subscale. 5-point scale: 1 (never) to 5 (almost always). Total scores are summed. Score range: 5-25	Higher scores indicate a greater social limitation.

Actual seeking professional help.

Actual seeking professional help for hearing impairment was measured using self-report during the telephone interview eight weeks after the initial interview. Actual help seeking is a dichotomous outcome variable, with a “yes” or “no” response to the questions: “Have you seen a professional for audiological consultation or have you scheduled an appointment to seek audiological consultation?” A “no” response was coded as “1” and a “yes” response was coded as “2.” If the participant’s response was no, an open-ended question was asked about why he or she did not seek professional help.

The participants were also asked if they sought professional help from an audiologist or their primary care physicians.

Intention to seek professional help.

Intention to seek professional help was the outcome variable. This measure was a one-item question of the participants' intention to seek professional help about hearing impairment from a previously used study using the TPB (Meister, Grugel, & Meis, 2014). A 5-point Likert-type scale was used for this question, with a rating of 1 (least likely) to 5 (most likely). The question was included at the beginning of the structured questionnaires.

Attitudes about Hearing Impairment among Older Adults.

Attitudes about hearing impairment was defined as perceived beliefs about hearing loss by older adults due to old age and measured by Attitudes toward Loss of Hearing Questionnaire (ALHQ v2.1) (Saunders & Cienkowski, 1996). The ALHQ v2.1 is a 22-item questionnaire with five scales: Denial of Hearing Loss (six items), Negative Associations (four items), Negative Coping Strategies (eight items), Manual Dexterity and Vision (three items), and Hearing-Related Esteem (two items). Participants indicated the extent to which they agreed or disagreed with the statement on a five-point (1-5) scale ranging from "Strongly disagree" to "Strongly agree." Two forms of the ALHQ are available; one for non-users of hearing aids and one for current users of hearing aids. The form for non-users of hearing aids was used. Item number one was both used for subscales denial of hearing loss and negative coping strategies. A total scale score is calculated by averaging the responses from the 22 items with possible total scores 1-5. The first and second questions are reverse-scored. The ALHQ is scored such that a high

score on any scale is indicative of a less favorable attitude towards hearing loss; that is, denial rather than acceptance of hearing loss, negative associations with hearing aids, poor coping strategies, poor manual dexterity and visual acuity, and low hearing-related esteem. The internal consistency values of the scales are adequate: four of the five scales have Cronbach's α coefficients greater than 0.80. The test-retest reliability of the scales also is also adequate; r-values ranged from 0.88 to 0.65 (Saunders, Forsline, & Jacobs, 2007).

Knowledge about Hearing Impairment among Older Adults.

Knowledge about hearing impairment was defined as perceived understanding of hearing loss by older adults due to old age. The Knowledge, Attitudes and Behavior (KAB) questionnaire (Saunders et al., 2014) was used to assess the knowledge about hearing impairment. The KAB consists of three sections, with a total of 49 questions. Section one consists of 16 questions that assess knowledge about the auditory system. Section two consists of 22 questions that assess attitudes towards hearing, hearing loss, and hearing conservation using Health Belief Model (HBM) constructs, and section three consists of 11 questions that assess behaviors associated with participation in noisy activities and use of hearing protection. The knowledge and attitude questions have a 5-point Likert-type response scale which can be self-administered, while the behavior section is best completed in an interview format. Only the 16-item knowledge scale was used for the study. Sample items included: "If I'm around loud sounds often, my ears can adjust and help protect my hearing," "A dishwasher can be loud enough to damage human hearing," "Sounds that are too loud can damage the ear canal," and "People with hearing loss caused by loud sounds can normally hear again if they wear a hearing aid."

Each item response was scored from 1 (I know this is true) to 5 (I know this is false). A total correct score (16) and a percent correct score are automatically computed taking reverse scoring into account. Higher scores indicate higher knowledge about hearing impairment. The scale's validity and reliability were initially examined in a sample of participants between the age of 18 and 80. Content validity was established; however, test-retest reliability was not formally examined (Saunders et al., 2014).

Stigma about Hearing Impairment.

Stigma related to hearing impairment was defined as the perception of what others might think should they find out that the older adult has a hearing impairment or is seeking professional help about their hearing loss. This was measured by two subscales of the Hearing Attitudes Rehabilitation Questionnaire (HARQ) (Hallam & Brooks, 1996). The HARQ is a 40-item questionnaire which assesses perception of older adults about hearing impairment and provision of hearing aid use. Each item response is scored from 1 (true) to 3 (not true). Subscales are computed and interpreted separately. Two of the seven subscales of HARQ were used in the study, which include: Hearing loss stigma (5 items) and perceived external pressure to be assessed (3 items). For the hearing loss stigma subscale, the total scores are interpreted as follows: 5-8 (low), 9-11 (average), and 12-15 (high). For the pressure to be assessed subscale, the scores are interpreted as follows: 3-4 (low), 5-7 (average), and 8-9 (high). Cronbach's alpha coefficient was satisfactory for most of the subscales ranging from 0.76 to 0.90. The test-retest reliability scores of 0.72 to 0.88 were also adequate for five subscales. However, reliability coefficients for aid not wanted (0.44) and positive expectation of aid (0.63) were low (Hallam & Brooks, 1996). These two subscales were not used in the study.

Self-Efficacy in Seeking Help among Older Adults with Hearing Impairment.

Self-efficacy in seeking help for hearing impairment was measured using Perceived Competence Scale (PCS) (Williams & Deci, 1996). The PCS is a short, 4-item Likert-type scale, designed to assess participants' feelings of competence to engage in behavior, or following through on some commitment. Each item response is scored from 1 (not at all true) to 7 (very true). The four items were adapted for hearing loss and included (e.g. I feel confident in my ability to manage my hearing loss). Total score on the PCS is calculated by averaging responses on the four items and higher scores indicate higher self-efficacy in seeking help. This is a tool that has been used extensively and has been found to have favorable internal consistency and validity (Ryan & Deci, 2000; Williams et al., 2004; Williams et al., 2006). Cronbach's alpha coefficients have consistently been above 0.80 in multiple studies (Williams & Deci, 1996; Williams, Freedman, & Deci, 1998)

Social Engagement.

Social Engagement refers to one's degree of involvement or participation in a community or society and was measured using the social limitation subscale of the Hearing Handicap Questionnaire (HHQ) (Noble & Gatehouse, 2004). The social limitation subscale is five items. The item responses are on a five-point scale (almost always, often, sometimes, rarely, never) and provide a measure of emotional distress and social restriction. Total scores for the social limitation subscale range from 5 to 25; higher scores indicate a greater social limitation. The HHQ has a single factor structure in older adults with hearing aids or who pursue a group communication program (Gatehouse & Noble, 2004; Hickson, Worrall, & Scarinci, 2007). A two-factor structure has been

reported in cochlear implant users (Noble, Tyler, Dunn, & Bhullar, 2008). The social limitation subscale of the HHQ has an adequate Cronbach's alpha of 0.93 (Noble et al., 2008).

Participant Characteristics.

Socio-demographic background of participants was assessed using an investigator-developed participant characteristics form (Appendix E). Data collected included the following: age in years, ethnicity, marital status, whether lives alone or with significant others, race, occupation, work status, education level, annual household income, and general health problems.

Procedures

The approval for the study was obtained from the Georgia State University Institutional Review Board (IRB). The participants were recruited using multiple recruitment strategies. Flyers were distributed at various sites where the hearing screening activities were conducted. The flyers included dates, times, and locations where the hearing screening were conducted for older adults.

The potential participants who indicated to the study PI that they were interested in participating were given an explanation about the study and participant involvement was described. The PI screened for eligibility criteria including giving the HHIE-S to participants to answer. Then, seated in a quiet environment, participants underwent a hearing screening using Shoebox Audiometry. Testing consisted of wearing a headset and following the instructions in the Shoebox monitor. The test determined whether the possible participant passed or failed the hearing test. If potential participants failed the Shoebox Audiometry, or if they had a handicap score of 10 and above on the HHIE-S

questionnaire (Ventry & Weinstein, 1983), written informed consent was obtained from eligible participants. A copy of the signed informed consent form was given to each participant. For participants who did not meet the screening criteria, a thank you note was given. The eligible participants received the study questionnaires to complete and the PI was available to answer any questions. If for some reason a participant was unable to complete all the questions at the time, he or she received a self-addressed stamped envelope to return additional questionnaires. After completing questionnaires, the participant received a reminder card about when the researcher planned to contact him or her by telephone for follow up. Participants also received written information about the results of their test that they could share with their health care provider if they desired. The time to complete questionnaires at T1 was estimated to take about 45 minutes to an hour. The second data collection time point was eight weeks after initial data collection. This follow up telephone call was to determine if the participant sought help for hearing loss and the call took about five to ten minutes. At the end of T1 the participants received education materials about hearing impairment and a list of available resources that are available to them. Participants completing the study received a thank you note through the mail for their participation. Figure 2 shows the summary of the research procedure.

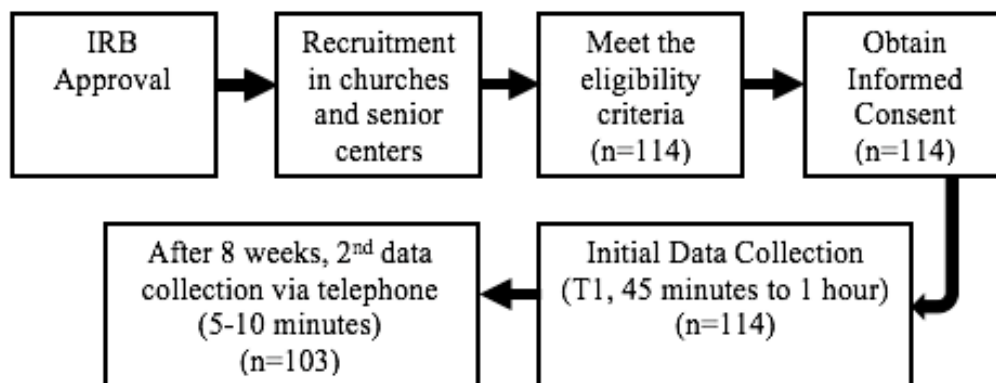


Figure 2. Research Procedure

Data Analysis

Data were examined for missing data and standard error checking was completed before data analysis. All data were analyzed using SPSS 24.0. Each study variable was checked for outliers, missing data, and distribution by performing frequency distribution, residual scatter plots, and descriptive statistics. Descriptive statistics, including measures of central tendency and dispersion, were reported for each study variable. All analyses were performed using two-tailed tests and setting statistical significance at $p < .05$. An internal consistency reliability coefficient for instruments was calculated as appropriate. Frequencies and percentages were calculated for the categorical data. Bivariate correlations using Pearson correlation coefficients and Spearman correlation were used to identify the relationships among study variables. Prior to performing inferential data analyses, study variables were examined for outliers, influential observations, and assumption violations (linearity, normality, and homoscedasticity). Since the data deviates from a normal distribution, appropriate transformations were conducted, or a non-parametric procedure was performed.

The independent variables (attitudes and knowledge about hearing impairment, stigma about hearing impairment, self-efficacy in seeking help, and social engagement) were examined for a relationship with intention to seek professional help and tested with Somers' d. Cochran-Armitage test of trend was used with these variables to examine associations with actual seeking professional help which is the dichotomous outcome variable.

Protection of Human Subjects

Protection of human subjects was ensured by obtaining an appropriate approval from Georgia State University Institutional Review Board. The researcher thoroughly explained the purpose, the overall procedure of the study, and the potential risks and benefits of participating in the study to the potential participants. Any questions the potential participant had prior to obtaining written informed consent were answered by the researcher. Screening using Shoebox Audiometry and HHIE-S was done before obtaining the informed consent. All participants received a copy of the signed consent. All participants were informed that their participation was voluntary, and they could withdraw from the study at any time. Areas related to confidentiality of participant characteristics and answers to surveys were protected. The participants' information that directly identified them was collected during the survey. The use of unique identifiers was located on the packets and the questionnaires. Only authorized members of the research team have access to the data. The results of the study were reported only in summary statistics, so responses cannot be indirectly linked to individuals via unique patterns of demographic or other responses from the survey. The unique number identifier list was maintained in a separate location from the participant contact

information list. There were no more risks to the older adults of this study other than those they encounter in everyday life. However, participants might have experienced emotional distress from the Shoebox Audiometry results or when answering the questionnaires. If necessary, the researcher planned to contact the faculty advisor, and a referral would be provided for counseling. Participants were informed that if counseling were needed, any expenses incurred would be their own responsibility.

CHAPTER IV

RESULTS

The results of this prospective correlational study of factors affecting health-seeking behavior among older adults with hearing impairment are presented in this chapter. A description of pre-analysis data screening procedures, description of sample characteristics, findings from the questionnaires, and hypothesis testing and research questions are reported.

Older adults having possible hearing problem ages 60 years and older were recruited from churches and senior centers in Cobb County, Georgia between February and June 2017 and screened for eligibility criteria. Details of screening and response rates are in Figure 3. There were 152 potential participants screened, 114 met the eligibility criteria. All the eligible participants agreed to participate in the study and completed the surveys during the initial data collection (T1). After eight weeks, the participants were reached via telephone by the investigator (T2) between April and August 2017. Eleven participants were lost to follow-up either because their telephone was not working, or the telephone call was not returned after three messages were left for the participants for 9.6% attrition rate.

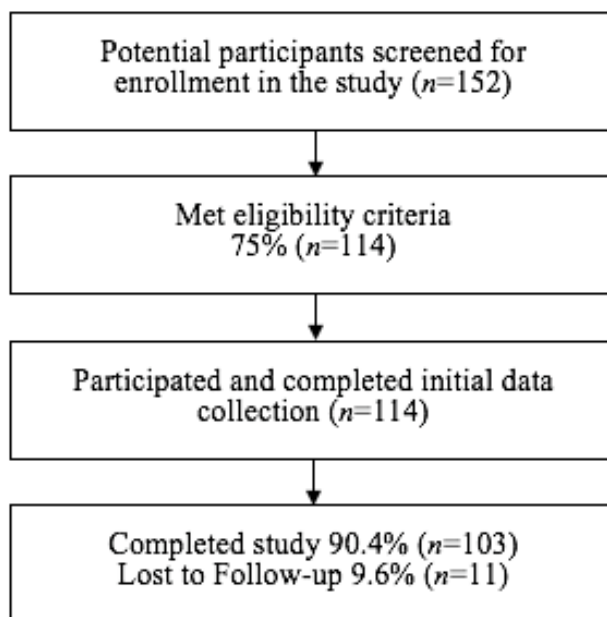


Figure 3. Screening, Enrollment and Attrition for older adults with possible hearing impairment.

Sample Characteristics

Characteristics of the total sample ($n=114$) and the two groups of those older adults who did seek professional help for possible hearing loss ($n=24$) were compared to those who did not seek professional help ($n=79$) are in Table 2.

Table 2

Older Adults with Hearing Impairment Characteristics (N=114)

Characteristics	Total	Seek Help			χ^2
		Yes (n=24)	No (n=79)	Lost to follow-up	
Age in Years M(SD)	73.1 (7.7)	73.9 (7.0)	72.7 (8.4)		
Gender (n) %					.43
Female	(93) 81.6	(18) 15.8	(65) 57.0	(10) 8.8	
Male	(21) 18.4	(6) 5.3	(14) 12.3	(1) 0.9	

(Table 2 Continued)

(Table 2 Continues)

Characteristics	Total	Seek Help			χ^2
		Yes (n=24)	No (n=79)	Lost to follow-up	
Ethnicity (n) %					.33
Hispanic or Latino	(3) 2.6	(0) 0.0	(3) 2.6	(0) 0.0	
Non-Hispanic or Latino	(111) 97.4	(24) 21.1	(76) 66.7	(11) 9.6	
Race (n) %					.15
Black	(36) 31.6	(11) 9.6	(20) 17.5	(5) 4.4	
White	(61) 53.5	(11) 9.6	(47) 41.2	(3) 2.6	
Asian	(17) 14.9	(2) 1.8	(12) 10.5	(3) 2.6	
Marital Status (n) %					.35
Single	(13) 11.4	(2) 1.8	(10) 8.8	(1) 0.9	
Married	(42) 36.8	(7) 6.1	(33) 28.9	(2) 1.8	
Divorced/Widowed/other	(59) 51.8	(15) 13.2	(36) 31.6	(8) 7.0	
Living with (n) %					.53
Alone	(39) 34.2	(9) 7.9	(27) 23.7	(3) 2.6	
Spouse	(42) 36.8	(7) 6.1	(33) 28.9	(2) 1.8	
Others	(33) 28.9	(8) 7.0	(19) 16.7	(6) 5.3	
Employment (n) %					.94
Retired	(110) 96.5	(23) 20.2	(76) 66.7	(11) 9.6	
Working	(4) 3.5	(1) 0.9	(3) 2.6	(0) 0.0	
Education (n) %					.59
< HS Graduate	5.3 (6)	0.0 (0)	4.4 (5)	0.9 (1)	
High School Graduate	32.5 (37)	5.3 (6)	23.7 (27)	3.5 (4)	
Some College or >	62.3 (71)	15.8 (18)	41.2 (47)	5.3 (6)	
Income (n) %					.37
Less than \$10,000	23.9 (22)	4.3 (4)	16.3 (15)	3.3 (3)	
\$10,001-\$20,000	16.3 (15)	4.3 (4)	10.9 (10)	1.1 (1)	
\$20,001-\$30,000	17.4 (16)	4.3 (4)	10.9 (10)	2.2 (2)	
\$30,001-\$40,000	10.9 (10)	1.1 (1)	8.7 (8)	1.1 (1)	
\$40,001-\$50,000	8.7 (8)	4.3 (4)	3.3 (3)	1.1 (1)	
Greater than \$50,000	22.8 (21)	4.3 (4)	17.4 (16)	1.1 (1)	
	(N= 92)	(n=21)	(n=67)	(n=9)	

Note: Chi Square for nominal variables for group differences

In the total sample, the majority of participants were Caucasian, female, and currently in their 70s. The majority of participants were divorced, widowed, or separated. Most of the participants were currently living with a spouse and were retired. Most participants were able to study for their college education and only six participants were not able to graduate from High School. Only 92 out of 114 participants who completed the initial data collection reported their income, and most of the participants reported an income of less than \$10,000 followed by participants who reported an income of greater than \$50,000. No statistical differences were noted between the characteristics of the participants who did seek help and who did not seek help among older adults with hearing impairment (Table 2).

Sample Hearing Health Characteristics

The health characteristics of the sample are the results of the screening of older adults for hearing impairment during the initial data collection using the Hearing Handicap Inventory for the Elderly-Screening Version (HHIE-S) and the Shoebox Audiometry test.

Table 3

Results of Screening Using Hearing Handicap Inventory for the Elderly (N=114)

Screening Tool	Total		Seek Help		Lost to follow-up	χ^2
	(n)	%	Yes	No		
No Handicap	(49)	43.0	(12) 10.5	(33) 28.9	(4) 3.5	.49
Mild-Moderate Handicap	(51)	44.7	(10) 8.8	(37) 32.5	(4) 3.5	
Significant Handicap	(14)	12.3	(2) 1.8	(9) 7.9	(3) 2.6	

Note: Chi-Square for group difference

Among the 114 participants screened for hearing impairment using HHIE-S most of the older adults had mild-moderate handicap (Table 3). There were 49 older adults who did not report hearing handicap, however they had mild hearing loss according to Shoebox Audiometry.

Table 4

Results of Screening Using Shoebox Audiometry (N=108)

Screening Tool	Total (n) %	Seek Help		Lost to follow- up	χ^2
		Yes	No		
No Hearing Loss	(6) 5.6	(0) 0.0	(5) 4.6	(1) 0.9	.59
Mild Hearing Loss	(68) 63.0	(14) 13.0	(47) 43.5	(7) 6.5	
Moderate Hearing Loss	(34) 31.5	(9) 8.3	(23) 21.3	(2) 1.9	

Note: Chi-Square for group difference

Among the 114 participants who completed the initial data collection, only 108 were screened for hearing loss using Shoebox Audiometry test. A majority of the participants had mild hearing loss. Most of the participants (43.5%) who did not seek professional help about their hearing had mild hearing loss, while 21.3% of those who did not seek professional help had moderate hearing loss. Six of the participants passed the Shoebox Audiometry test, however they had mild-moderate handicap scores according to their HHIE-S (Table 4). There were no significant differences in the hearing health characteristics of the participants who did seek professional help and for those who did not.

The general health problems reported by the participants are in Table 5. The participants were asked to list their general health problems with an open-ended question (Appendix E). A large number of participants who completed the second data collection did not list any health problems on the form.

Table 5

General Health Problems of Older Adults with Hearing Impairment

Health Characteristics	Total (n) %	Seek Help		Lost to follow-up
		Yes	No	
Medical Condition	N=45	<i>n</i> =9	<i>n</i> =32	<i>n</i> =4
One	(18) 40.0	(3) 6.7	(14) 31.1	(1) 2.2
Two	(14) 31.1	(3) 6.7	(10) 22.2	(1) 2.2
Three or more	(13) 28.9	(3) 6.7	(8) 17.8	(2) 4.4
Current Medication	N=38	<i>n</i> =5	<i>n</i> =26	<i>n</i> =7
Three or more	(23) 60.5	(3) 7.9	(17) 44.7	(3) 7.9
Two	(9) 23.7	(1) 2.6	(6) 15.8	(2) 5.3
One	(6) 15.8	(1) 2.6	(3) 7.9	(2) 5.3

Among the 114 participants who completed the initial data collection, only 45 participants (40%) reported having other medical conditions, and 38 (27%) of the participants indicated that they were taking medications. Most of the participants only reported having one medical condition, and most of these participants did not seek professional help about their hearing impairment. The most commonly reported conditions were hypertension, diabetes, arthritis, hypothyroidism, and high cholesterol.

The majority of participants were taking three or more medications. Most of the participants who did not seek professional help about their hearing impairment were taking three or more medications.

Descriptive Statistics for Major Study Variables

Pre-analysis data screening was conducted prior to statistical analysis and included screening for errors of data entry, outliers, normal distribution, multicollinearity, and missing data. Normality was assessed for all interval/ratio level variables by analyzing skewness, kurtosis, histograms, and box plots as outlined by Munro (2013) and Field (2013). The Shapiro-Wilk and Kilmogorov-Smirnov was conducted to check normality on all theoretical variables. Screening indicated that all variables were not normally distributed. A square root and natural logarithmic transformation was conducted on the variables and normal distribution was not achieved.

Concepts of the Theory of Planned Behavior

The descriptive statistics for all instruments representing theoretical concepts, including intention, attitude (knowledge and attitudes about hearing loss), subjective norm (stigma about hearing loss), and perceived behavioral control (self-efficacy about hearing loss and social engagement) are presented in Table 6 based on the participants who completed the study (N=114).

In general, older adults had a positive attitude towards hearing impairment, little knowledge about hearing impairment, low stigma level, were confident in their ability to seek professional help, higher ability to engage in social activities, and had greater intention to seek professional help about their hearing impairment. Participants in the study had a favorable attitude towards hearing impairment with lower scores in negative

associations, negative coping strategies, manual dexterity and vision. However, denial of hearing loss and hearing-related esteem were above the midpoint, indicating a less favorable attitude towards hearing loss (Table 6).

Table 6

Descriptive Statistics and Cronbach's Alpha for Theoretical Variables (N=114)

Variable	M	(SD)	Observed Range	Possible Range	Cronbach's Alpha
Intention	3.19	(1.51)	1-5	1-5	
Attitudes (ALHQ) ^a	2.58	(.52)	1.36-4.14	1-5	.73
Denial of Hearing Loss	3.10	(.87)	1-5	1-5	.68
Negative Association	2.34	(1.02)	1-5	1-5	.70
Negative Coping Strategies	2.48	(.68)	1.25-4.25	1-5	.61
Manual Dexterity & Vision	2.11	(1.03)	1-5	1-5	.64
Hearing Related Esteem	3.16	(1.28)	1-5	1-5	.45
Knowledge (KAB) ^b	35.58	(17.76)	0-81.25	0-100	.57
Stigma (HLS) ^c	5.20	(1.40)	4-10	4-12	.60
Stigma (PTA) ^d	3.70	(1.19)	3-9	3-9	.65
Self-Efficacy (PCS) ^e	5.57	(1.47)	1.25-7	1-7	.85
Social Engagement (HHQ) ^f	8.41	(3.90)	5-20	5-25	.92

^aAttitudes Towards Loss of Hearing Questionnaire; ^bKnowledge, Attitudes and Behavior Questionnaire; ^cHearing Attitudes Rehabilitation Questionnaire-Hearing Loss Stigma; ^dHearing Attitudes Rehabilitation Questionnaire Pressure To be Assessed; ^ePerceived Competence Scale; ^fHearing Handicap Questionnaire.

Internal consistency reliability coefficients are also presented in Table 6. The instruments had acceptable Cronbach's alpha coefficients except for the knowledge, hearing related esteem, and stigma scale. The knowledge scale (KAB) data were examined including the item-to-total correlations; however, removing items did not sufficiently increase the scale's reliability coefficient. Although the knowledge scale Cronbach's alpha coefficient was slightly low, the decision was made to include it in the hypotheses testing. Because the hearing related esteem subscale of the ALHQ only has two items, if one item were removed, it would not be possible to compute Cronbach's alpha coefficient. Therefore, it was not used in the analysis and only descriptive data are reported. The stigma scale had two subscales, one representing level of hearing loss stigma and the other level of pressure to be assessed. To improve the reliability of the stigma scale, the item to total correlations of the scale were reviewed and items with less than .20 correlations were removed systematically until the Cronbach's alpha was improved to .60 for level of hearing loss stigma. Item 2 which was about perceiving difficulty hearing to be normal at old age from the Hearing Attitudes Rehabilitation (HARQ) questionnaire was removed from the hearing loss stigma subscale resulting in a Revised Stigma scale of 7 items. The revised version was used to compute a total score that was used in remaining analyses.

Intention to Seek Professional Help

Participants were asked about their intention to seek professional help about their hearing impairment. On average, scores fell slightly above the midpoint of the scale on the intention to seek professional help, indicating a high level of intention to seek help

(Table 6). More than one third of the older adults indicated that they were most likely to seek professional help about their hearing impairment.

Attitudes about Hearing Impairment

The overall attitude scores of the participants from the ALHQ were below midpoint, indicating a more favorable attitude towards hearing loss. However, denial of hearing loss and hearing related esteem subscale scores were above midpoint, indicating a less favorable attitude towards hearing loss. Scores on the three remaining subscales, negative association, negative coping strategies, and manual dexterity and vision, were below the midpoint indicating a positive attitude towards hearing loss (Table 6).

Knowledge about Hearing Impairment

Knowledge about hearing loss was measured using the KAB. On average, the participants' scores were low ($M=35.58$, $SD=17.76$). This indicated that they could not recognize some causes of damage to hearing and the importance of using hearing protection.

Stigma about Hearing Impairment

On average, participants reported low levels of stigma based on the two subscales: hearing loss stigma ($M=5.20$, $SD=1.40$) and pressure to be assessed ($M=3.70$, $SD=1.19$) as measured by HARQ.

Self-Efficacy in Seeking Help about Hearing Impairment and Social Engagement

The mean score for overall confidence in managing their hearing impairment (Perceived Behavioral Control) was high ($M=5.57$, $SD=1.47$) out of possible total score of seven. Self-efficacy about hearing loss scores from PCS indicated that generally the participants felt confident in their ability to manage their hearing impairment.

Social engagement scores of older adults with hearing impairment from Hearing Handicap Questionnaire (HHQ) ($M=8.41$, $SD=3.90$) was low. This indicated that they were socially engaging in activities.

Relationships among Participant Characteristics and Major Study Variables

Spearman's correlation and analysis of variance were used for the 114 participants who completed the initial data collection. These were used to examine the relationships among the participant characteristics and theoretical variables and the results are presented in Table 7 (Predictive Variables) and Table 8 (Outcome Measures). The correlations also were used to determine which variables to include in the models for hypothesis testing. Variables with significant correlations with the outcomes variables of intention to seek help and actual help seeking were included in the models.

Table 7 shows that higher educational level and higher income were significantly associated with higher scores on the knowledge scale about hearing loss. None of the other participant characteristics were significantly related to knowledge about hearing loss.

There was a difference in attitude towards loss of hearing among the groups of different races as determined by analysis of variance (Table 7). Post-hoc Tukey tests indicated that only one comparison trended towards statistical significance; namely, that Asians had more negative attitude towards hearing impairment compared to those who were Caucasians ($p=.025$).

Higher income was associated with higher self-efficacy among participants. Higher degree of hearing loss based on the results of the Shoebox audiometry test was associated with lower self-efficacy to manage hearing impairment. Participants who

reported having greater hearing handicap had lower self-efficacy to manage hearing impairment and less social engagement (Table 7).

Table 8 shows that older age was associated with denial of hearing loss and manual dexterity and vision. There was no difference in denial of hearing loss and negative coping strategies among older adults' based on marital status. A post-hoc Tukey tests indicated that there were no statistically significant differences in denial of hearing loss and negative coping strategies among single, married, and divorced or separated older adults.

Older adults' educational attainment was associated with negative coping strategies. Higher degree of hearing loss based on Shoebox audiometry test was negatively associated with denial of hearing loss. Hearing handicap was associated with denial of hearing loss and negative coping strategies (Table 8).

Table 7

Relationships among Older Adults Characteristics and Predictive Variables (N=114)

	Knowledge	Attitudes (ALHQ)	Stigma (HLS)	Stigma (PTA)	Self- Efficacy	Social Engagement
Age ^a	-0.11	-0.06	-0.08	-0.03	-.17	0.11
Race ^b	0.58	3.67*	1.65	0.18	0.44	1.83
Marital Status ^b	0.36	2.75	0.15	0.27	1.68	1.01
Employment ^b	0.05	0.42	0.64	0.67	1.18	2.42
Education ^a	0.15	-0.08	-0.01	-0.04	0.14	-0.12
Income ^a	0.29**	0.04	0.14	0.00	0.25*	-0.01
Hearing Loss ^a	0.05	-0.10	0.09	0.00	-0.20*	0.11
Hearing Handicap ^a	0.12	0.16	0.19	-0.05	-0.34**	0.51**

Note. *p < .05, **p < .01, two-tailed, ^a Spearman's correlation reported, ^b Analysis of Variance reported. ALHQ= Attitudes Towards Loss of Hearing Questionnaire, HLS= Hearing loss stigma, PTA= Pressure to be assessed.

Table 8

Relationships among Older Adults Characteristics and Predictive Variables (ALHQ Subscales) (N=114)

	Denial of Hearing Loss	Negative Association	Negative Coping Strategies	Manual Dexterity
Age ^a	0.25*	-0.01	0.08	0.19*
Race ^b	2.57	1.35	1.37	0.34
Marital Status ^b	3.34*	2.94	3.09*	0.56
Employment ^b	0.86	1.20	1.01	0.92
Education ^a	0.06	-0.01	-0.19*	-0.08
Income ^a	0.06	0.17	-0.14	-0.15
Hearing Loss ^a	-0.30**	-0.10	-0.11	-0.04
Hearing Handicap ^a	-0.20*	0.09	0.34**	0.03

Note. *p < .05, **p < .01, two-tailed, ^a Spearman's correlation reported, ^b Analysis of Variance reported.

Table 9

Relationships among Older Adults Characteristics and Outcome Measures

	Intention	Health-Seeking Behavior ^c
Age ^a	-0.08	0.79
Race ^b	1.83	3.82
Ethnicity ^b	0.26	0.94
Marital Status ^b	1.01	4.82
Employment ^b	2.42	0.01
Education ^a	0.28**	2.70
Income ^a	-0.03	5.35
Hearing Loss ^a	0.03	1.93
Hearing Handicap ^a	0.04	0.79

Note. * $p < .05$, ** $p < .01$, two-tailed. ^a Spearman's correlation reported, ^b Analysis of Variance reported. ^c Chi Square test reported.

Table 9 shows that older adults with higher educational level was associated with higher health-seeking intention among older adults with hearing impairment. None of the other participant characteristics were significantly related to the health-seeking intention and seeking professional help of older adults with hearing impairment.

Relationships among Theoretical Variables

The correlations among theoretical variables are presented in Table 10. Higher knowledge about hearing loss was associated with higher intention to seek professional

help. Less favorable attitude towards hearing loss was associated with less social engagement in activities. Greater self-efficacy to manage hearing loss was associated with more social engagement in activities. Stigma or greater negative perception about hearing loss was associated with less social engagement in activities.

The relationships among theoretical variables are shown in Table 10 while the ALHQ subscales are shown in Table 11. Less denial of hearing loss was associated with more social engagement in activities. Less denial of hearing loss was associated with higher intention to seek professional help. Higher negative coping strategies were associated with lower self-efficacy to manage hearing loss. Higher negative associations and higher negative coping strategies were associated with less social engagement in activities (Table 11). Finally, higher intention to seek professional help and greater social engagement in activities were associated with health-seeking behavior among older adults with hearing impairment (Table 10).

Table 10

Relationships among Theoretical Variables (N=114)

	ALHQ	Knowledge	Stigma (HLS)	Stigma (PTA)	Self-Efficacy	Social Engagement	Intention
ALHQ							
Knowledge	0.08						
Stigma (HLS)	0.11	0.17					
Stigma (PTA)	0.11	-0.11	0.03				
Self-Efficacy	-0.16	0.08	-0.16	-0.14			
Social Engagement	0.19*	0.10	0.30**	0.04	-0.48**		
Intention	-0.12	0.19*	-0.06	-0.15	-0.08	0.08	
Health-Seeking Behavior ^a	35.03	15.24	8.36	1.28	26.85	25.44*	28.74**

Note. * $p < .05$, ** $p < .01$, two-tailed. Spearman's correlation reported. ALHQ= Attitudes Toward Loss of Hearing Questionnaire, HLS= Hearing loss stigma, PTA= Pressure to be assessed. ^a Chi Square test reported.

Table 11

Relationships among Theoretical Variables (ALHQ Subscales) (N=114)

	Denial	Negative Association	Negative Coping Strategies	Manual Dexterity & Vision
Negative Association	0.26**			
Negative Coping Strategies	0.04	0.34**		
Manual Dexterity & Vision	0.02	0.26**	0.25**	
Knowledge	0.03	0.04	0.05	0.05
Stigma (HLS)	-0.05	0.02	0.14	0.09
Stigma (PTA)	0.00	0.12	0.11	-0.00
Self-Efficacy	0.12	-0.11	-0.37**	-0.12
Social Engagement	-0.36**	0.18	0.46**	0.14
Intention	-0.24**	-0.01	0.03	0.07
Health-Seeking Behavior	20.63	16.55	26.85	9.98

Note. * $p < .05$, ** $p < .01$, two-tailed. Spearman's correlation reported. HLS= Hearing loss stigma, PTA= Pressure to be assessed. ^a Chi Square test reported

Hypothesis Testing

Hypothesis 1a: *More positive attitudes and knowledge about hearing impairment will be associated with more health-seeking intention and seeking professional help among older adults with possible hearing impairment.*

Less denial of hearing loss and higher knowledge about hearing loss were significantly associated with higher health-seeking intention among older adults with hearing impairment (Table 9.1). However, no association was found between denial of hearing loss, negative associations, negative coping strategies, manual dexterity and vision, hearing-related esteem and knowledge about hearing impairment to health-seeking behavior of older adults. These findings partially support hypothesis 1a (Table 9).

Since an association was found between health-seeking intention and health-seeking behavior about hearing impairment, the significant variables were included in the model (Table 9.1). A Cochran-Armitage test of trend was run to determine whether a linear trend exists between the older adults' attitudes toward hearing loss, knowledge about hearing impairment, health-seeking intention, and seeking professional help about their hearing impairment. The Cochran-Armitage test of trend showed a statistically significant linear trend: higher knowledge about hearing impairment (8.748, $p = .003$) and higher health-seeking intention (22.65, $p = <.01$) were associated with higher proportion of older adults with hearing impairment who sought professional help. Therefore, hypothesis 1a was partially supported.

Hypothesis 1b: Less stigma about hearing impairment will be associated with more health-seeking intention and seeking professional help among older adults with possible hearing impairment.

The hypothesis was tested by conducting Cochran-Armitage test of trend and Somers'd. Although the relationship was in expected direction of older adults with less stigma had higher intention ($d = -.009$, $d = -.160$, $p = .138$) in seeking professional help about hearing impairment, it was not statistically significant. Therefore, stigma about hearing loss and pressure to be assessed were not significantly related to health-seeking intention and health-seeking behavior among older adults with hearing impairment. Therefore, the hypothesis was not supported.

Hypothesis 1c: Higher self-efficacy in seeking help about hearing impairment will be associated with more health-seeking intention and seeking professional help among older adults with possible hearing impairment.

Older adults reporting higher self-efficacy about managing hearing impairment did not report higher intention and seeking professional help after eight weeks. The relationship between self-efficacy and seeking help was in the opposite direction indicating that lower self-efficacy could lead to higher intention ($d = -.045$, $p = .562$) and seek professional help ($d = -.065$, $p = .224$), however it was not statistically significant. Therefore, there was no significant association between self-efficacy in seeking help and health-seeking behavior. Therefore, the hypothesis was not supported.

Research Questions

Research Question 1d: What factors (knowledge and attitudes about hearing impairment, stigma about hearing impairment, and self-efficacy in seeking help about hearing impairment) are associated with health-seeking intention and seeking professional help among older adults with possible hearing impairment?

Since previous variables were not significant in the trend analysis to put in a final model, bivariate correlations were used to determine the factors associated with health-seeking intention and seeking professional help among older adults with hearing impairment. Among the independent variables, denial of hearing loss and knowledge about hearing impairment were significantly associated with health-seeking intention (Table 13). Knowledge about hearing impairment, and health-seeking intention were associated with seeking professional help among older adults with hearing impairment. In addition, social engagement in activities was associated with health-seeking behavior of older adults with hearing impairment (Table 9).

Research Question 1e: What is the association between social engagement and self-efficacy in seeking help among older adults with possible hearing impairment?

Spearman's rank correlation coefficients were calculated to determine the association between social engagement and self-efficacy in seeking help among older adults with hearing impairment. There was a strong negative correlation between self-efficacy scores for managing hearing loss and hearing handicap in older adults with hearing impairment (Table 9), this indicated that older adults with higher self-efficacy level have higher social engagement.

Eight-Week Follow Up after Hearing Screening and Initial Data Collection

As part of the eight-week follow up, a semi-structured interview was used to ask older adults specifically about seeking professional help about their hearing impairment. Most study participants did not seek professional help about their possible hearing impairment (76.6%); only 24 of the 103 participants (completed both time points) did seek professional help. Of those participants who did seek professional help for their hearing loss (n=24) about half consulted a hearing specialist, while about 37.5% of the participants who seek professional help about their hearing impairment consulted their primary care physician (Table 12).

Table 12

Type of Health Care Sought for Hearing of Older Adults with Hearing Impairment (n=24)

Help Received	<i>n</i>	%
Hearing Specialist	13	(54.1)
Primary Care Physician	9	(37.5)
Others (EENT)	2	(8.4)

The responses of the older adults with hearing impairment who did seek professional help after eight weeks were presented in Table 13. The majority of the participants reported that they were told that they needed hearing rehabilitation. Only one third of the participants who did seek professional help reported that they would consider the use of a hearing aid.

Table 13

Recommendations for Older Adults After Seeking Professional Help (n=24)

	<i>n</i>	(%)
Information from Audiologist		
Needs hearing aid	11	(45.8)
Needs hearing treatment	2	(8.3)
Information from PCP		
Referral to Audiologist	6	(25)
Referral to EENT	3	(12.5)
Information from EENT		
Needs hearing treatment	2	(8.3)
Consider the use of hearing aid	8	(33.3)

Participants who did not seek professional help about their hearing impairment were asked to describe the reason why they did not seek professional help. Their responses, which were content coded, are reported in Table 14. The most common response of the older adults when asked why they did not seek professional help during telephone follow-up was “I don’t need to.” Other responses of the participants about the misconception of hearing loss were “it was just a minor hearing problem,” “I’m old anyway,” “I had it checked a long time ago and nothing changed.”

Table 14

Reasons for Not Seeking Professional Help about Hearing Impairment (n=79)

Reasons for Not Seeking Help	<i>n</i>	(%)
Denial “I don’t need to” “I don’t have to” “I believe I don’t need it”	24	(30.4)
Misconception “Just mild hearing problem” “I’m old” “I had it checked, nothing changed” “I only go to doctor for serious problem”	19	(24.1)
Delay “This is in my to-do list”	14	(17.7)
Dismissal “Lot of things going on now”	11	(13.9)
Cost “no money” “expensive”	7	(8.9)
Fear “I’m not ready”	2	(2.5)
Other	2	(2.5)

This chapter presented the results of a prospective, correlational study to determine the relationship between knowledge and attitudes about hearing impairment, stigma about hearing impairment, self-efficacy in seeking professional help about hearing impairment, and health-seeking intention to seek professional help. A description of participants’ characteristics, findings from the questionnaires, results of hypothesis testing, and research questions answers were reported from the 114 older adults with hearing impairment who completed the initial data collection.

Only hypothesis 1a was partially supported. Knowledge about hearing loss, social engagement in activities, and health-seeking intention were the predictors of seeking professional help among this sample of older adults with hearing impairment. Less social engagement in activities was associated with negative associations, negative coping strategies and hearing loss stigma. Greater social engagement in activities was associated with denial of hearing loss and self-efficacy in seeking help about hearing impairment. Stigma about hearing loss was negatively correlated with self-efficacy in seeking help about hearing impairment. A discussion of these results will be presented in Chapter V.

CHAPTER V

DISCUSSION AND CONCLUSIONS

Chapter V presents a discussion of study findings and conclusions of the study results. This chapter ends with a discussion of the study limitations, strengths of the study, implications for practice, use of the Theory of Planned Behavior in health-seeking behavior among older adults with hearing impairment, and future research.

Although the prevalence of hearing impairment is reported to be increasing and despite the negative consequences of hearing impairment, only a small number of those with hearing impairment seek professional help. Health care providers need to understand what factors influence health-seeking behavior of older adults with hearing impairment. Previous studies have focused on behavioral intention to use hearing aids but not for those older adults who are identified as having some degree of hearing loss at the time of audiometry screening. This study was not the first study (Meister, Grugel, & Meis, 2014; Wiesner & Tesch-Romer, 1996) about hearing impairment that used the Theory of Planned Behavior, however the TPB has not previously been used to predict the intention of older adults with hearing impairment to seek professional help and follow up and whether they engaged in actual health-seeking behavior. This study adds to the limited body of literature related to health-seeking behavior since higher health-seeking intention predicts actual seeking behavior of older adults with hearing impairment.

In general, older adults had a positive attitude towards hearing impairment, little knowledge about hearing impairment, low stigma level, were confident in their ability to

seek professional help, higher ability to engage in social activities, and had greater intention to seek professional help about their hearing impairment. Despite the positive attitudes and greater intention to seek professional help, these perceptions did not translate into positive behavior of health-seeking by consulting a hearing specialist. Less than one quarter of older adults sought professional help at eight weeks following a failed hearing screening either by self-report or a quick screening test. If the older adults in this study who were lost to follow-up at eight weeks were considered to not seek professional help about their hearing impairment, only 20% of the older adults sought professional help. Hearing loss is perceived by most individuals as a natural part of the aging process. Majority of the participants had mild hearing loss and mild-moderate hearing handicap so they may not perceive the hearing impairment to be severe enough to engage in health-seeking behavior. In addition, during follow up most older adults did not seek professional help because they believed that they did not need to do so. Acceptance may be a barrier in health-seeking behavior which was also one of common reasons that the participants reported during follow-up for not seeking professional help about their hearing impairment. Most of the participants had higher ability to engage in social activities since they were engaging with others, had mild hearing loss, and function socially well; this may have contributed to few seeking professional help.

Most older adults indicated that they intended to seek professional help, and most did not try to reach their health care providers or primary care physician about their hearing impairment. From interviews at eight weeks follow up, older adults indicated that the most common reasons for not seeking professional help were denial and misconception that hearing impairment is not a serious health problem.

Although attitudes are important, they are insufficient to predict the actual behavior in health-seeking among older adults with hearing impairment. Most of these older adults never had a hearing screening before and had low knowledge about hearing rehabilitation or intervention. Therefore, awareness of older adults regarding the importance of hearing health and knowing the consequences of hearing impairment could provide important data. Other health behavior models may be more useful than the TPB in addressing health-seeking behavior of older adults with hearing impairment.

Knowledge and Attitudes about Hearing Impairment

Knowledge scores ranged from 0% to 81.25%, suggesting that the knowledge about hearing impairment of most participants could have been improved. Higher knowledge about hearing impairment was associated with higher intention to seek professional help and seeking professional help. This finding is similar to Meister et al. (2014) who found that the knowledge about the options for hearing rehabilitation was important for the intention to engage in hearing rehabilitation. In the current study, there was no association found between knowledge about hearing impairment, denial of hearing loss, negative associations, negative coping strategies, manual dexterity and vision, and hearing-related esteem. This is in contrast from the findings of Saunders (2014) that knowledge scores were significantly related to attitudes and self-efficacy in using hearing aid. However, the sample size in the current study was smaller, participants were usually attending social programs in senior centers, and majority of them belong to mild hearing loss category based on Shoebox audiometry.

In the current study, positive coping strategies and higher intention to seek professional help were influenced by the participants' educational level. In other words,

older adults with higher educational level will likely engage in positive coping strategies and which may have strengthened their intention to seek professional help. Higher income was associated with higher knowledge about hearing impairment. However, educational level and income were not associated with health-seeking behavior of older adults with hearing impairment. This is consistent with the findings of Benova et al. (2015) that socioeconomic position was not associated with any other stage of health-seeking behavior. Older adults with hearing impairment need to learn about hearing protection such as noise associated with activities (e.g. mowing yard, using hairdryer, garbage truck, power equipment) that can damage hearing, exposures in sound level (loud music, overcrowded places), and use of hearing protection. Knowing which factors affect one's hearing can allow for one to prevent further damage by engaging in activities that will protect their hearing. The association between knowledge and seeking professional help provides evidence for clinicians to provide education about hearing impairment that will help to prevent further hearing damage and encourage older adults to engage in positive health-seeking behavior. These findings are consistent with research that has shown improved quality of life and positive outcomes when older adults receive support and education regarding hearing impairment (Gagne, Southall & Jennings, 2011; Kramer et al., 2005).

In general, participants in the study had a favorable attitude towards hearing impairment with lower scores in negative associations, negative coping strategies, manual dexterity and vision. The large portion of these participants had mild hearing loss and they were usually going to senior centers to engage in social activities that may have had a large impact on their day to day activities. However, denial of hearing loss and

hearing-related esteem scores were above the midpoint indicating a less favorable attitude towards hearing loss. Research about hearing-related esteem is scarce, and in this study the two-item subscale did not have adequate reliability thus it is unclear what was measured. Additional psychometric studies are needed to improve the measurement of hearing-related esteem. Self-esteem is associated with self-confidence, social engagement and the perception that one can succeed at a particular task (Kricos, 2000; Orth, Robins, & Roberts, 2008; Warner-Czyz et al., 2015). A favorable attitude towards hearing loss would be expected to result in an individual having the confidence to engage in positive health-seeking behavior.

A less favorable attitude towards hearing impairment was associated with greater hearing handicap. This is consistent with what has long been found in the literature (Davis et al., 2016; Knudsen et al., 2010; Meyer et al., 2014; Saunders et al., 2016; Wu et al., 2004). In addition, attitude towards hearing impairment such as denial of hearing loss and negative coping strategies were associated with less social engagement in activities. In this study, greater social engagement in activities was a predictor of positive health-seeking behavior among participants. In other words, health-seeking behavior of older adults with hearing impairment was influenced by the degree to which they were engaged or restricted in social activities. One explanation may be that those who are involved in more social activities may want to continue that level of engagement and recognize how hearing is important in social situations.

In this study, although denial of hearing loss was associated with health-seeking intention, only health seeking intention was associated with actual health-seeking behavior of older adults with hearing impairment. However, during follow-up most of

the participants who did not see their healthcare provider reported that they believed that they did not need to seek professional help about their hearing. Since a large portion of the group had mild hearing loss, the participants did not consider their hearing loss to be a problem and they did not feel the need to seek professional help. This is consistent in a recent study (N=321) in which only half of the seniors with hearing loss admitted that they have the condition. Most were in the state of denial that the problem was something that should be treated (Mick, Kawachi, & Lin, 2014).

Stigma about Hearing Impairment

Perceived stigma emerged as an important influence in the decision-making process of the study participants (Wallhagen, 2010). In the current study, older adults with more negative perceptions about hearing impairment had greater hearing handicap and greater social engagement in activities. Older adults with less negative perceptions were more confident about their ability to manage hearing impairment, but stigma about hearing impairment was not associated with intention to seek professional help and seeking professional help. This finding is consistent with the findings of Meyer et al. (2014) that attitudinal factors such as stigma and ageism have little influence on older adults' decision to engage in positive health-seeking behavior. Older adults were reluctant to identify themselves as a person with hearing impairment. Past research has shown that reluctance to identify as having hearing impairment influences people not to engage in hearing rehabilitation or intervention program about hearing impairment (Hickson et al., 2006; Kochkin, 2007; Kramer et al., 2009; Rolfe & Gardner, 2016).

Self-Efficacy in Seeking Help about Hearing Impairment

Older adults with higher income, mild hearing loss, and less hearing handicap were more confident about their ability to manage their hearing impairment. Positive coping strategies and low hearing loss stigma were influenced by the older adults' higher confidence about their ability to manage their hearing impairment. The relationship between hearing loss and confidence is consistent with the findings of Saunders et al. (2016) and Ferguson et al. (2016) that older adults with hearing impairment and greater confidence in their ability to communicate were less likely to engage in hearing rehabilitation. However, in the current study higher self-efficacy to manage hearing impairment was not associated with health-seeking intention and seeking professional help in this study. This is in contrast with the findings of previous studies that older adults who had higher levels of self-efficacy were more likely to engage in managing their hearing impairment (Hickson et al., 2014) and went on to become successful hearing aid users (Meyer, Hickson, & Fletcher, 2014). It is possible that since older adults were just screened and informed that they may have hearing loss during the study, they were not ready to take action in terms of seeking professional help. A person's readiness to adopt and maintain health behavior has been widely addressed in health literature (Ferguson, Woodley, & Munro, 2016; Laplante-Levesque et al., 2013; Laplante-Levesque et al., 2012). Perceiving a decrease in hearing ability over time and readiness to take action (Prochaska & DiClemente, 2005) to overcome hearing impairment might be more likely to prompt health-seeking behavior among older adults.

Social Engagement

Study participants engaged more in social activities with lower hearing handicap and when they were more confident about their ability to manage hearing impairment. In this study, older adults with higher self-efficacy in seeking professional help had higher social engagement. This is consistent with the result of the study conducted by Perkins et al. (2008) who found a relationship of self-efficacy and participation in physical and social activity among older adults in Spain. The association between self-efficacy and social engagement also is consistent with a McAuley and colleagues (2005) study that showed higher self-efficacy and higher social engagement in activities could lead to positive health-seeking behavior. The findings suggest that older adults should be provided with programs designed to enhance confidence in their ability to engage in social activities. Furthermore, low social self-efficacy predicted loneliness and social isolation (Ahmad et al., 2014; Isaac et al., 2018; Valtorta et al., 2016).

Greater social engagement among older adults was not associated with health-seeking intention about hearing impairment. The findings of this study about social engagement are consistent with some previous studies which reported that being socially engaged was not associated with health-seeking intention (Dawes et al., 2015; Stark & Hickson, 2004). In contrast, social engagement was associated with health-seeking behavior in this study. However, social engagement was not a significant predictor of health-seeking behavior in the final model. Research about social engagement and health-seeking behavior is sparse. Social engagement is the extent to which health behaviors influence social relationships and social restrictions. Social relationships influence health outcomes in several ways, involving physiological, psychological, and

behavioral aspects (Taylor, 2011). Being socially engaged may impact health outcomes by influencing health-related behaviors such as preventive and lifestyle behaviors, seeking professional help, and management of hearing impairment. In addition, many studies provide evidence that social engagement influences health behavior (Denney, 2010; Umberson et al., 2010; Umberson & Montes, 2010). In this study the measure of social engagement was based on measure of the opposite characteristic which was social restriction. Most participants had low social restriction which indicated that the older adults had higher ability to engage in social activities. Social restriction or lack of social relationships constitute a major risk factor for health (Holt-Lunstad et al., 2010). Other studies also used a proxy measure of social engagement that involved identifying activities related to watching, hearing, or reading (Brink & Stones, 2007; Dawes et al., 2015; Kochkin & Rogin, 2000).

Intention to Seek Professional Help

Most of the older adults with hearing impairment at follow-up had high intention to seek professional help but only about one fourth of the participants did seek professional help, which is consistent with National Institute on Deafness and Other Communication Disorders (2017) that only 20% of those individuals who might benefit from treatment actually seek help about hearing impairment.

The intention to seek professional help was mainly driven by less denial of hearing loss and more knowledge about hearing impairment of older adults. Greater intention to seek professional help was associated with positive health-seeking behavior about hearing impairment. This is consistent with some previous studies which reported that the person's intention will result in engaging in hearing rehabilitation (Cobelli et al.,

2014; Meister et al., 2014). This finding supports the theoretical relationship between a person's intention and actual behavior in health-seeking among older adults with hearing impairment.

Individual Perceptions and Health-Seeking Behavior

According to Meyer et al. (2014), the most important factors that were associated with the decisions to seek professional help about hearing impairment were attitudinal beliefs (perceived benefits) and support from significant others. However, in the current study, only higher knowledge about hearing impairment and higher intention to seek professional help predicted the health-seeking behavior of older adults with hearing impairment. Stigma about hearing impairment and self-efficacy in seeking help about hearing impairment were not associated with health-seeking behavior of the study participants. Most of the subscales of the ALHQ such as denial of hearing loss, negative association, negative coping strategies, manual dexterity and vision were not associated with health-seeking behavior except for the hearing-related esteem. However, since the measure of hearing-related esteem has low reliability scores, it was not included in the final model to analyze the findings of the study.

During follow-up the most common reason of the older adults for not engaging in seeking professional help about their hearing impairment was denial. Denial is identified as an attitude towards hearing impairment (Humes et al., 2003; Saunders et al., 2005). One explanation for this finding may be because attitude towards hearing impairment did not facilitate health-seeking behavior of older adults but served as a barrier in seeking professional help. Denial of hearing loss was associated with health-seeking intention but not the actual behavior in seeking help about hearing impairment. Another

explanation for this finding may be the comparison of the groups with a small number of older adults who actually sought professional help (n=24) which was not even a quarter of the total number of the participants. Future research is needed to better understand these relationships.

The second reason that older adults reported for not seeking help during follow-up was misconception that hearing impairment is not a serious health problem. This is consistent with the result of the study in which knowledge about hearing impairment is a predictor of seeking professional help among older adults. When older adults reported gradual awareness of a hearing problem, it prompted them to seek help and rehabilitation about hearing impairment (Laplante-Levasque et al., 2012). Anecdotally, many older adults were not aware that they have hearing impairment; the participants seemed surprised when informed of possible hearing loss based on screening with Shoebox audiometry. Some reported during follow-up that they just had mild hearing problem and they only seek professional help for serious problems. More information about hearing impairment might help them understand the importance of engaging in positive health-seeking behavior.

The third reason for not seeking help that older adults reported was the decision to delay follow-up. When it comes to older adults seeking help to address hearing impairment, the decision to delay can be reinforced by environmental influences or external social factors (Clements, 2015). Another reason could be the timing of the study. Since it was end of spring and summer time, vacation plans may have been a reason to delay follow-up.

The fourth reason that participants reported for not seeking professional help was dismissal that hearing impairment is not worthy of serious consideration to be a health problem and to be the least priority for healthcare decision making. This may suggest that older adults did not consider hearing rehabilitation necessary to live a fully engaged life and many had mild hearing loss. Some participants reported that there are lots of things going on with their lives. Older adults who are affected by hearing impairment tend to recognize that it is a part of the ageing process and therefore they do not need to seek professional help (Meyer & Hickson, 2012).

The fifth reason reported by the study participants was the cost of seeking professional help about hearing impairment. Since most participants were retired, they may have limited resources. Some older adults with hearing impairment simply do not have enough income to afford seeking professional help or hearing rehabilitation. Financial cost is one of the main factors that has been found to influence older adults regarding hearing rehabilitation decisions (Laplante-Levesque, Hickson, & Worrall, 2010). Older adults' decision to seek professional help about hearing impairment can also be determined by the perceived need or benefit (Saunders et al., 2013) and whether there will be more benefits than barriers in seeking professional help about hearing impairment (Choi et al., 2016; Meyer & Hickson, 2012; Meyer et al., 2014; Rolfe & Gardner, 2016;).

The older adults' reasons for not seeking professional help about hearing impairment were mostly related to negative attitudes towards hearing help-seeking. However, financial costs need to be put into consideration since it greatly impacts the healthcare decisions of older adults. The results of the study imply that health-seeking

behavior of older adults with hearing impairment was influenced by their knowledge about hearing impairment, attitudes about hearing impairment, social engagement in activities, and intention to seek professional help about hearing impairment.

Limitations of the Study

The limitations must be taken into account when considering the findings of the study. First, the sample size did not provide sufficient power to adequately test more complex statistical models. Second, hearing loss was not clinically diagnosed by an audiologist or hearing specialist. However, using Shoebox Audiometry is one of the strengths of the study since the researcher did not rely solely on self-report. This study was limited in funding and used self-report during follow-up to determine whether they actually sought professional help about their hearing impairment. However, few participants reported that they did seek professional help about their hearing impairment. Third, the knowledge scale had a low reliability score. Since there was no other reliable scale available to measure the knowledge about hearing impairment, the KAB was used in data analysis. Fourth, the hearing loss stigma scale had a low reliability score. Despite an attempt to improve the score by eliminating items with low item-to-total correlations, the reliability was still below acceptable standards. This may have contributed to a lack of significance for this variable. Fifth, since this is a prospective correlational study the time frame for follow-up may not be long enough to determine the older adults' health-seeking behavior.

Strengths of the Study

This study had several strengths. First, the study used a well-established theoretical model, the TPB, as a framework to examine factors affecting health-seeking

behavior among older adults with hearing impairment. Second, this study used a prospective correlational design of following older adults whether or not they engaged in health-seeking behavior eight weeks after they were screened for hearing impairment using an objective audiometry test and self-report hearing handicap questionnaire. Third, this study used a semi-structured interview to obtain information about the participants' engagement in health-seeking behavior and their stated reasons if they decided not to do so.

Implications for Theory Building

Based on the findings of the study, several variables suggested by the TPB were not found to predict health-seeking behavior among older adults with hearing impairment. Attitudes and self-efficacy were not associated with intention to seek professional help and health-seeking behavior. It may be that attitudes and self-efficacy have an indirect relationship with intention to seek professional help or they may be modifying variables, but this was not evaluated in the study. Larger samples are needed for future research, using more sophisticated statistical analysis that may be helpful in determining relationships.

This model was adapted from studies that used it to explain the intention of older adults with hearing impairment to use hearing aids or adopt hearing rehabilitation. Hearing aid use pertains to the aspect of health behavior wherein individuals decided to manage their hearing impairment through rehabilitation. In addition, hearing aid use involves adjustment for older adults with regards to technology use. Health-seeking behavior is complex and influenced by many factors. Likewise, behavior may be influenced by the person's health state or health condition. Further study in larger

samples may identify additional variables and relationships. Given the complexities of older adults and their health as well as health-seeking behavior, the TPB components may not be the best fit for determining the factors affecting health-seeking behavior and predicting behavior of older adults with hearing impairment. Using other models of behavior and motivation theories may be a better fit for examining the factors affecting health-seeking behavior of older adults with hearing impairment.

Implications for Practice

The findings of this study do suggest ways to improve clinical practice and improve health outcomes. The study participants included older adults who are experiencing early signs of hearing impairment in need of support and resources that will help them to prevent further loss of hearing. The data represent the views of those less willing to seek professional help about their hearing impairment. Likewise, overall older adults in the study had lower knowledge about hearing loss. An opportunity exists for health care providers to assist patients with hearing impairment. Education about hearing impairment is one area which has potential for improving older adults' engagement in seeking professional help. Education is needed to increase the knowledge of older adults about hearing impairment since this variable was found to predict health-seeking behavior at follow-up. In addition, health care providers and health care organizations must collaborate to identify different resources that are available for older adults with hearing impairment in promoting the success of hearing rehabilitation and intervention programs.

Health teaching in different institutions, organizations, and community partners must be developed and provided by health care practitioners and health care teams to

increase awareness about hearing health and emphasize on the importance of promoting healthy behaviors for those at risk of having hearing impairment. In addition, hearing screening among older adults should be incorporated into nursing care in different health care settings such as outpatient clinics, health centers, assisted living facilities, nursing homes, and hospitals.

Future Research

This study adds to the growing body of research that examines the factors that influence health-seeking behavior of older adults with hearing impairment. First, replication of this study with a larger sample size to increase the power and test the hypotheses and answer the research questions is needed. Because intention to seek professional help was high in this study and has been found in numerous studies to predict health-seeking behavior, it may be that the small sample size in this study led to inconclusive findings.

Second, different theories about health behavior may be better to guide research about factors affecting health-seeking among older adults with hearing impairment. This study found possible additional variables such as denial, misconception, and motivation which could be included in future testing.

Third, a study with a longer follow-up time might provide better information about health-seeking behavior. Collecting data over time would increase the likelihood of older adults to engage in health-seeking behavior and might give individuals more time to act on their intention to seek professional help. In addition, further studies need to be conducted in other locations and venues and by using different recruitment methodologies to ascertain the generalizability of the findings.

Fourth, conceptual clarity of stigma and knowledge are needed with reliable and valid measures for use in research. Evaluation of psychometric properties of instruments could improve measurement of concepts.

Finally, since knowledge about hearing impairment was found to predict health-seeking intention and health-seeking behavior, future studies are needed for developing and testing interventions to increase knowledge about hearing impairment. Since other variables were found to be associated with health-seeking behavior, this need to take into consideration when designing an educational intervention program that could benefit this vulnerable population to increase awareness about hearing health.

Conclusion

This study adds to the body of literature concerning factors which influence the health-seeking behavior of older adults with hearing impairment. Future research is needed to determine whether the adapted TPB is adequate for predicting health-seeking behavior among older adults with hearing impairment. While other research about hearing impairment supports the use of TPB, this study suggests that other concepts may better explain the factors that influence health-seeking behavior in older adults with hearing impairment.

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APPENDIX A
INSTITUTIONAL REVIEW BOARD APPROVAL

INSTITUTIONAL REVIEW BOARD

Mail: P.O. Box 3999
 Atlanta, Georgia 30302-3999
 Phone: 404-413-3500
 Fax: 404-413-3504

In Person: 58 Edgewood
 3rd Floor



February 09, 2018

Principal Investigator: Martha Polovich, PhD

Key Personnel: Cranford, Joan; Polovich, Martha, PhD; Ramos, Mary Dioise

Study Department: B.F. Lewis School of Nursing

Study Title: Health-Seeking Behavior among Older Adults with Hearing Impairment

Review Type: Expedited Continuing Review, 7

IRB Number: H17387

Reference Number: 348142

Approval Date:

02/09/2018

Expiration Date:

02/08/2019

The Georgia State University Institutional Review Board (IRB) reviewed and approved the above referenced study in accordance with 45 CFR 46.111. The IRB has reviewed and approved the research protocol and any informed consent forms, recruitment materials, and other research materials that are marked as approved in the application. The approval period is listed above. Research that has been approved by the IRB may be subject to further appropriate review and approval or disapproval by officials of the Institution.

Federal regulations require researchers to follow specific procedures in a timely manner. For the protection of all concerned, the IRB calls your attention to the following obligations that you have as Principal Investigator of this study.

1. For any changes to the study (except to protect the safety of participants), an Amendment Application must be submitted to the IRB. The Amendment Application must be reviewed and approved before any changes can take place
2. Any unanticipated/adverse events or problems occurring as a result of participation in this study must be reported immediately to the IRB using the Unanticipated/Adverse Event Form.
3. Principal investigators are responsible for ensuring that informed consent is properly documented in accordance with 45 CFR 46.116.
 - The Informed Consent Form (ICF) used must be the one reviewed and approved by the IRB with the approval dates stamped on each page.
4. For any research that is conducted beyond the approval period, a Renewal Application must be submitted at least 30 days prior to the expiration date. The Renewal Application must be

approved by the IRB before the expiration date else automatic termination of this study will occur. If the study expires, all research activities associated with the study must cease and a new application must be approved before any work can continue.

5. When the study is completed, a Study Closure Report must be submitted to the IRB.

All of the above referenced forms are available online at <http://protocol.gsu.edu>. Please do not hesitate to contact the Office of Research Integrity (404-413-3500) if you have any questions or concerns.

Sincerely,



Cynthia A. Hoffner, IRB Chair

INSTITUTIONAL REVIEW BOARD

Mail: P.O. Box 3999
Atlanta, Georgia 30302-3999
Phone: 404/413-3500
Fax: 404/413-3504

In Person: Dahlberg Hall
30 Courtland St, Suite 217



February 09, 2017

Principal Investigator: Martha Polovich, PhD
Key Personnel: Cranford, Joan; Polovich, Martha, PhD; Ramos, Mary
Study Department: GSU - B.F. Lewis School of Nursing
Study Title: Health-Seeking Behavior among Older Adults with Hearing Impairment
Review Type: Expedited, 4,7
IRB Number: H17387
Reference Number: 342837

Approval Date:
02/09/2017

Expiration Date:
02/08/2018

The Georgia State University Institutional Review Board (IRB) reviewed and approved the above referenced study in accordance with 45 CFR 46.111. The IRB has reviewed and approved the study and any informed consent forms, recruitment materials, and other research materials that are marked as approved in the application. The approval period is listed above. Research that has been approved by the IRB may be subject to further appropriate review and approval or disapproval by officials of the Institution.

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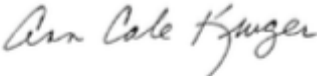
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All of the above referenced forms are available online at <http://protocol.gsu.edu>. Please do not hesitate to contact the Office of Research Integrity (404-413-3500) if you have any questions or concerns.

Sincerely,

A handwritten signature in cursive script that reads "Ann Cole Kruger".

Ann Kruger, IRB Chair

INSTITUTIONAL REVIEW BOARD

Mail: P.O. Box 3999
 Atlanta, Georgia 30302-3999
 Phone: 404/413-3500
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In Person: Dahlberg Hall
 30 Courtland St, Suite 217



March 09, 2017

Principal Investigator: Martha Polovich, PhD

Key Personnel: Cranford, Joan; Polovich, Martha, PhD; Ramos, Mary

Study Department: GSU - B.F. Lewis School of Nursing

Study Title: Health-Seeking Behavior among Older Adults with Hearing Impairment

Review Type: Expedited Amendment

IRB Number: H17387

Reference Number: 343419

Approval Date: 02/09/2017

Expiration Date: 02/08/2018

Amendment Effective Date: 03/09/2017

The Georgia State University Institutional Review Board reviewed and **approved** the amendment to your above referenced Study.

This amendment is approved for the following modifications:

- A new site for research provided a Letter of Support

The amendment does not alter the approval period which is listed above and the study must be renewed at least 30 days before the expiration date if research is to continue beyond that time frame. Any unanticipated/adverse events or problems resulting from this investigation must be reported immediately to the University Institutional Review Board.

For more information visit our website at www.gsu.edu/irb.

Sincerely,

A handwritten signature in black ink, appearing to read "Yan Ki Wai".

Yan Ki Wai, IRB Member

Federal Wide Assurance Number: 00000129

APPENDIX B
INFORMED CONSENT

Georgia State University
Byrdine F. Lewis School of Nursing and Health Professions
Informed Consent

Title: Health-Seeking Behavior among Older Adults with Hearing Impairment

Principal Investigator: Martha Polovich, PhD, RN

Student Principal Investigator: Mary Dioise Ramos, MAN, RN

I. Purpose:

You are invited to participate in a research study. The purpose of the study is to investigate the factors that are thought to influence the health-seeking intentions and seeking professional help of older adults with possible hearing loss. You are invited to participate because you are above 60 years old, able to read and write English, and have possible hearing loss based on screening tests using the Shoebox™ Audiometry and Hearing Handicap Inventory-Screening version questionnaire. A total of 97 participants will be recruited for this study. Participation will require an hour of your time and a follow up call will be done after 8 weeks that will take approximately 15 minutes of your time.

II. Procedures:

You will receive the study questionnaires to answer and the PI will be available to answer any questions. If for some reason that you are not able to complete all the questions at the time, you will receive a self-addressed stamped envelope to return additional questionnaires.

After completing questionnaires, you will receive a reminder card about when the researcher will contact you by telephone for follow up. You will also receive written information about the results of the screening test that you can share with your health care provider if you desire. You will also be receiving education materials about hearing loss and list of available resources that are available for you. The time to complete questionnaires is estimated to take about an hour of your time. After eight weeks, you will receive a follow up telephone call from the researcher that will take approximately 15 minutes of your time.

III. Risks:

In this study, you will not have any more risks than you would in a normal day of life. However, you may experience emotional distress while answering the study questionnaires. If you experience emotional distress, the PI will provide educational materials and list of resources about further assessment and treatment. In addition, the student PI will contact the faculty advisor, and community resources including information for further evaluation and counseling will be provided. The participants will be informed that they may benefit by further evaluation. However, if further evaluation or counseling is needed, the participants will be informed that any expenses incurred will be their own responsibility.

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IRB EXPIRATION DATE: 02/08/2018

IV. Benefits:

Participation in this study may not benefit you personally. However, participating in this study will possibly provide you the sense of accomplishment for helping to expand the scientific knowledge about a better understanding of health-seeking behavior among older adults with possible hearing loss.

V. Compensation:

You will receive a \$5 Walmart gift card as a token of appreciation for participating in this study. This gift card will be given to you after completing all the questionnaires at the meeting. You will be asked to sign the paperwork when you receive the gift card at the end of the meeting.

VI. Voluntary Participation and Withdrawal:

Participation in research is voluntary. You do not have to be in this study. If you decide to be in the study and change your mind, you have the right to drop out at any time. You may stop participating at any time. Whatever you decide, you will not lose any benefits to which you are otherwise entitled.

VII. Confidentiality:

We will keep your records private to the extent allowed by law. Only Dr. Polovich, Ms. Ramos, Dr. Clark, and Dr. Saunders will have access to the information you provide. Information may also be shared with those who make sure the study is done correctly (GSU Institutional Review Board, the Office for Human Research Protection (OHRP)). We will use a study number and initials rather than your name on study records. The information you provide will be stored in a password and firewall protected computers, and locked cabinet. The key code sheet will be stored separately from the data to protect privacy. The key code sheet will be destroyed after the follow-up call has been done. Your name and other facts that might point to you will not appear when we present this study or publish its results. The findings will be summarized and reported in group form. You will not be identified personally.

VIII. Contact Persons:

Contact Dr. Martha Polovich at (404) 413-1171 and mpolovich2@gsu.edu or Ms. Mary Dioise Ramos at (404) 413-1196 and mramos9@gsu.edu if you have questions, concerns, or complaints about this study. You can also call if you think you have been harmed by the study. Call Susan Vogtner in the Georgia State University Office of Research Integrity at 404-413-3513 or svogtner1@gsu.edu if you want to talk to someone who is not part of the study team. You can talk about questions, concerns, offer input, obtain information, or suggestions about the study. You can also call Susan Vogtner if you have questions or concerns about your rights in this study.

IX. Copy of Consent Form to Participant:

We will give you a copy of this consent form to keep.

If you are willing to volunteer for this research, please sign below.

Participant

Date

Principal Investigator or Researcher Obtaining Consent

Date

GSU
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IRB EXPIRATION DATE: 02/08/2018

APPENDIX C
LETTER OF SUPPORT


COBB COUNTY SENIOR SERVICES DEPARTMENT

P.O. Box 649
 Marietta, Georgia 30061-0649
 770.528.5366
 jessica.gill@cobbcounty.org
 www.cobbseiors.org

Jessica Gill
 Executive Director

Ms. Mary Dioise Ramos, MAN, RN

Byrdine F. Lewis School of Nursing
 Georgia State University
 P.O. Box 4019
 Atlanta, GA 30302-4019

RE: Health Seeking Behavior among Older Adults with Hearing Impairment

Dear *Ms. Ramos*,

I am providing this letter to document and express my support for investigating the factors that are associated with health-seeking intentions and seeking professional help about hearing impairment among older adults with a hearing problem.

Cobb Senior Services serve to provide programs and activities accessible to seniors' every day, in order to keep them active as they age. The unique integration of this project within the ongoing community activities of the centers will help older adults to proactively engage in behavior that will help in promoting health and prevent diseases.

You will have access to the Cobb Senior Services' Multi-purpose Senior Centers and any other areas deemed necessary to conduct this study. We can discuss how our staff can be of assistance to you, possibly during recruitment and data collection.

I look forward to a written copy of your results and hope that our staff and older adults living in the Cobb County may benefit from the results.

Yours truly,


 Jessica Gill
 Executive Director



SAINT THOMAS THE APOSTLE
CATHOLIC CHURCH

Staffed by the Missionaries of La Salette

Ms. Mary Dioise Ramos, MAN, RN

Byrdine F. Lewis School of Nursing
Georgia State University
P.O. Box 4019
Atlanta, GA 30302-4019

RE: Health Seeking Behavior among Older Adults with Hearing Impairment

Dear *Ms. Ramos*,

I am providing this letter to document and express my overwhelming support for investigating the factors that are associated with health-seeking intentions and seeking professional help about hearing impairment among older adults with a hearing problem.

St. Thomas The Apostle Catholic Church serve to provide programs and activities accessible to seniors' every day, in order to keep them active as they age. The unique integration of this project within the ongoing community activities of the church will help older adults to proactively engage in behavior that will help in promoting health and prevent diseases.

You will have full access to the St. Thomas The Apostle Catholic Church recreation area and any other areas deemed necessary to conduct this study. We can discuss how our staff can be of assistance to you, possibly during recruitment and data collection.

I look forward to your results and hope that our church members and older adults attending the church may benefit from the results.

Sincerely,

Rev. Brian Sheridan, M.S.
Pastor



APPENDIX D
SCREENING TOOL

SCREENING FORM

Age: <hr/>	Hearing Aid: Yes No	Shoebox™ Audiometry <hr/>	HHIE-S Score <hr/>
List all medications (including over the counter) <hr/> <hr/> <hr/> <hr/> <hr/> <hr/>			

APPENDIX E
DEMOGRAPHIC FORM

DEMOGRAPHIC FORM

Age: 	Ethnicity: _____ 1. Hispanic or Latino 2. Non-Hispanic or Latino
Marital Status: <input type="checkbox"/> Single <input type="checkbox"/> Married <input type="checkbox"/> Divorced <input type="checkbox"/> Widowed <input type="checkbox"/> Separated <input type="checkbox"/> Long Term Relationship	Lives with: <input type="checkbox"/> Alone <input type="checkbox"/> Spouse <input type="checkbox"/> Domestic Partner <input type="checkbox"/> Other, specify: _____
Race: <input type="checkbox"/> Black or African American <input type="checkbox"/> White or Caucasian <input type="checkbox"/> Asian <input type="checkbox"/> North American Native <input type="checkbox"/> Other, specify: _____	Occupation _____ <hr style="border: 1px solid black;"/> <hr style="border: 1px solid black;"/> Work Status: <input type="checkbox"/> Retired <input type="checkbox"/> Full time <input type="checkbox"/> Part time <input type="checkbox"/> Unemployed <input type="checkbox"/> Disabled
Education: <input type="checkbox"/> Less than 9 th grade <input type="checkbox"/> Partial High School <input type="checkbox"/> High School graduate <input type="checkbox"/> 1-3 years of college <input type="checkbox"/> College graduate <input type="checkbox"/> Post-graduate study <input type="checkbox"/> Others	Annual Household Income: <input type="checkbox"/> Less than \$10,000 <input type="checkbox"/> \$10,001- \$20,000 <input type="checkbox"/> \$20,001- \$30,000 <input type="checkbox"/> \$30,001- \$40,000 <input type="checkbox"/> \$40,001- \$50,000 <input type="checkbox"/> Greater than \$50,000
General Health Problems: <hr style="border: 0.5px solid black;"/> <hr style="border: 0.5px solid black;"/> <hr style="border: 0.5px solid black;"/> <hr style="border: 0.5px solid black;"/>	

APPENDIX F
FLYER

Are you 60 years old & above?
Do you have hearing
problems?



Research Participants wanted.

WHERE: _____

WHEN: _____

TIME: _____

About the study:

- Looking at factors affecting health-seeking behavior among older adults with possible hearing loss
- Will take 1 hour, at Senior Centers in Cobb County
- Participants will receive a free hearing screening and be asked questions about health-seeking behavior
- Participants will receive \$ 5.00

Who's conducting the study:

Mary Dioise Ramos, Doctoral Student in Byrdine F. Lewis School of

Nursing and Health Professions is conducting this study. If you are

interested in participating or have more questions, please contact

(404) 242-7053 or mramos9@gsu.edu